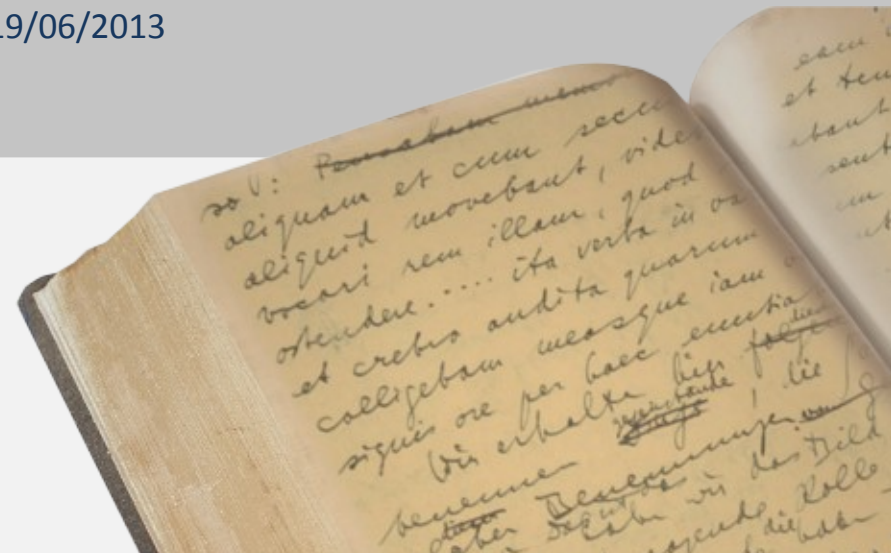


Metadata: From Records to Graphs

Prof. Dr. Stefan Gradmann (KU Leuven)

OAI 8, Genève, 19/06/2013



Data about Data: Objects and Assertions

- Object/Data Models, Assertion Models and Pragmatics

From Containers to Context, from Records to Graphs, from Catalogs to Research Data:

- Container → Content → Context: Libraries approaching the End of the Gutenberg Galaxis and the emerging Linked Data Web
- The Europeana Data Model (EDM) in this context
- EDM (and RDF) enabling Research with content based and context driven services
- Required Cultural Changes: terms/thinking to get rid of

Hands on: Semantic Annotation using Pundit

Metadata. Meta Data?

What is this Tutorial About?

Not about ...

- ... cataloguing practice
- ... manual vs. automated metadata generation
- ... named entity detection
- ... metadata licensing issues
- ... metadata quality issues
- ...

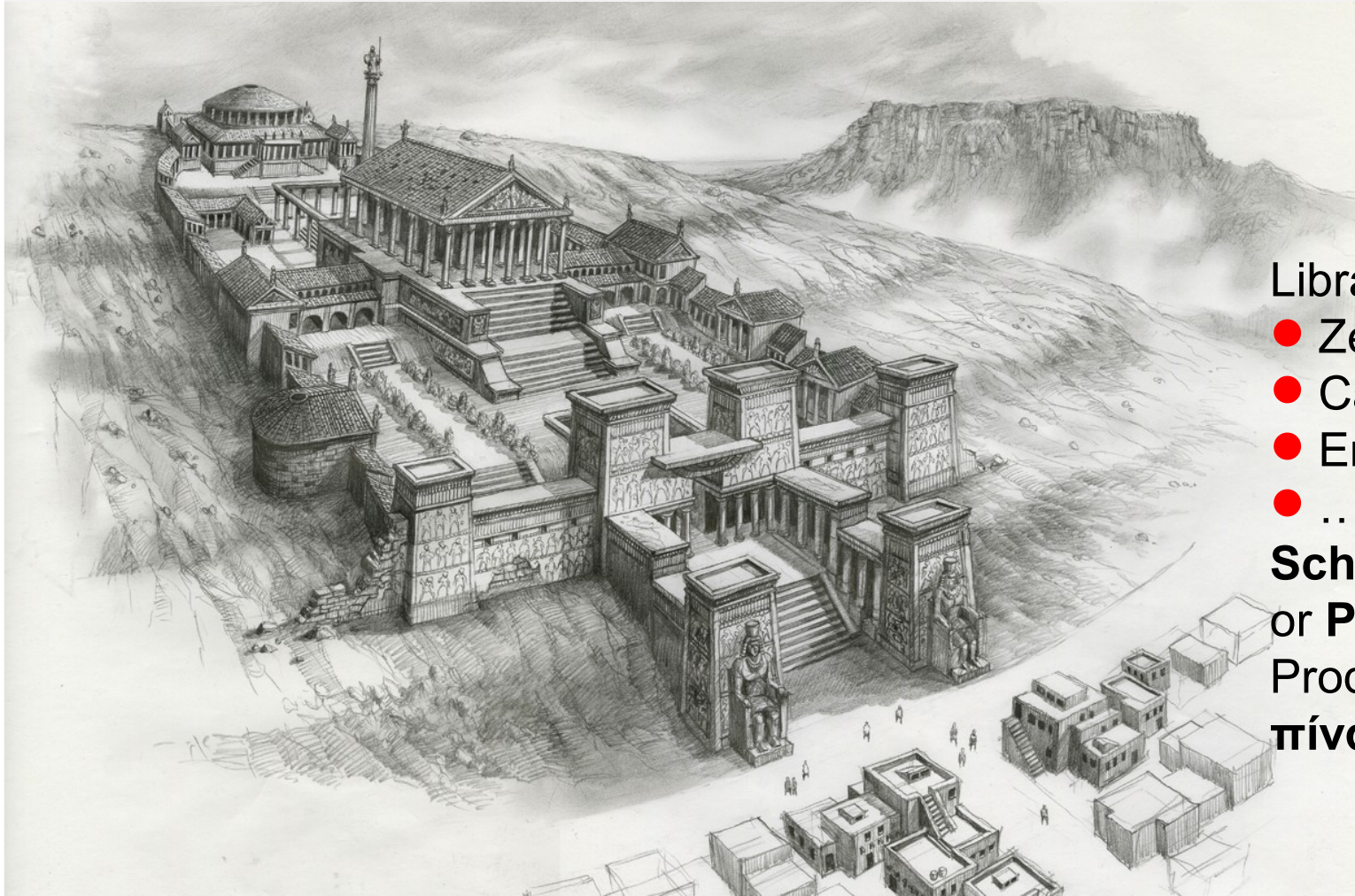
But rather about ...

- Data about data?
- Statements on things in the world
 - Like in
<http://www.tei-c.org/release/doc/tei-p5-doc/en/html/DR.html#DREMB>
 - Or in
http://primocat.bl.uk/F?func=direct&local_base=PRIMO&doc_number=012233614&format=001&con_lng=prm
- Having
 - A subject: aboutness (far from being obvious!)
 - A grammar: a data / object model (mostly implicit)
 - <http://people.umass.edu/phil335-klement-2/tlp/tlp.html>
 - A Syntax: coding and serialisation
 - A pragmatic context: an implied audience
- → This tutorial is restricted to bibliographical metadata in libraries

Container → Content → Context

Libraries approaching the end of the Gutenberg Galaxis

Long before the Parenthesis: Alexandria

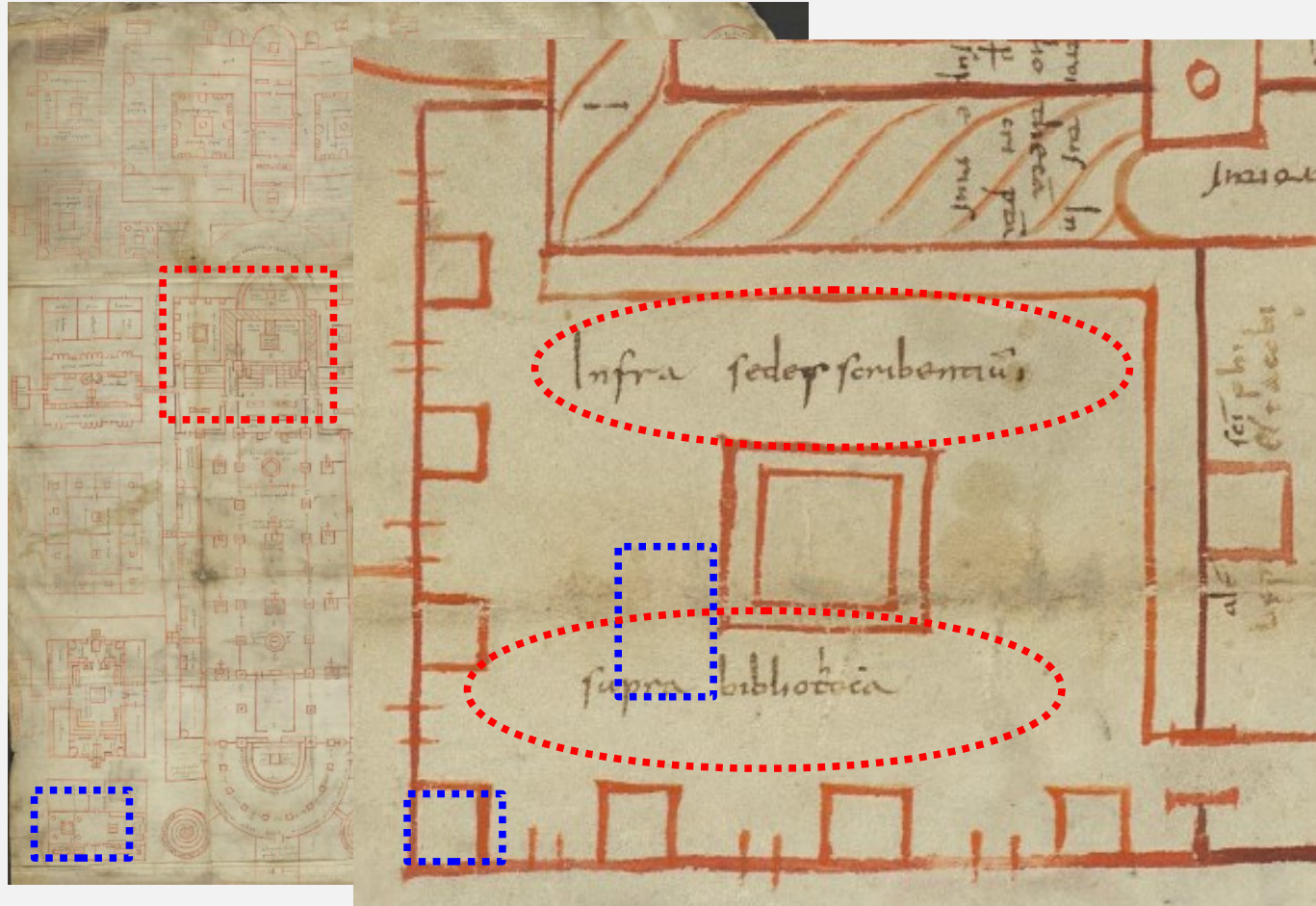


Librarians:

- Zenodotus
- Callimachus
- Erathosthenes
- ...

Scholars and /
or **Poets**
Producing
πίνακες

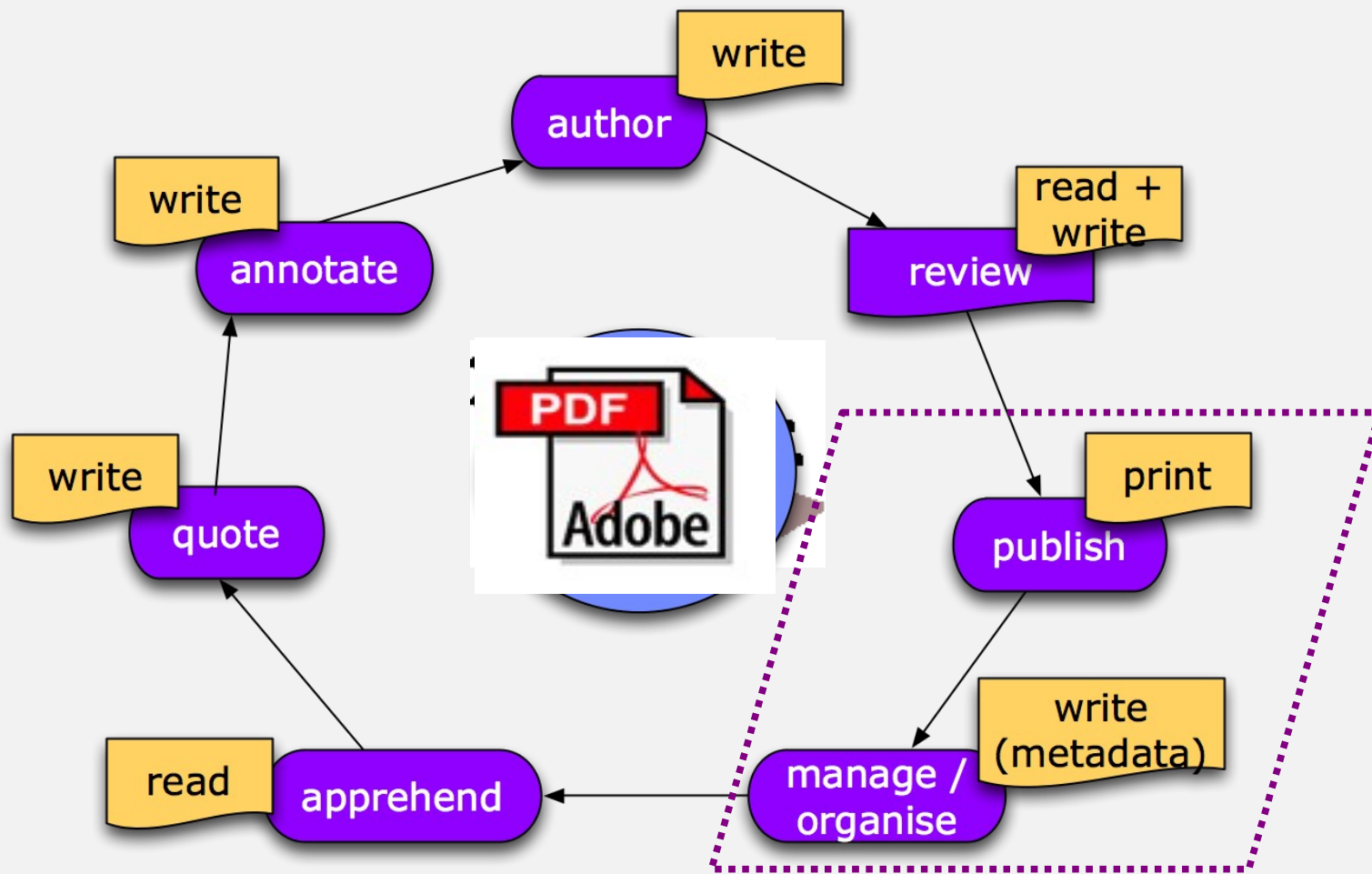
Before the Parenthesis: St. Gall



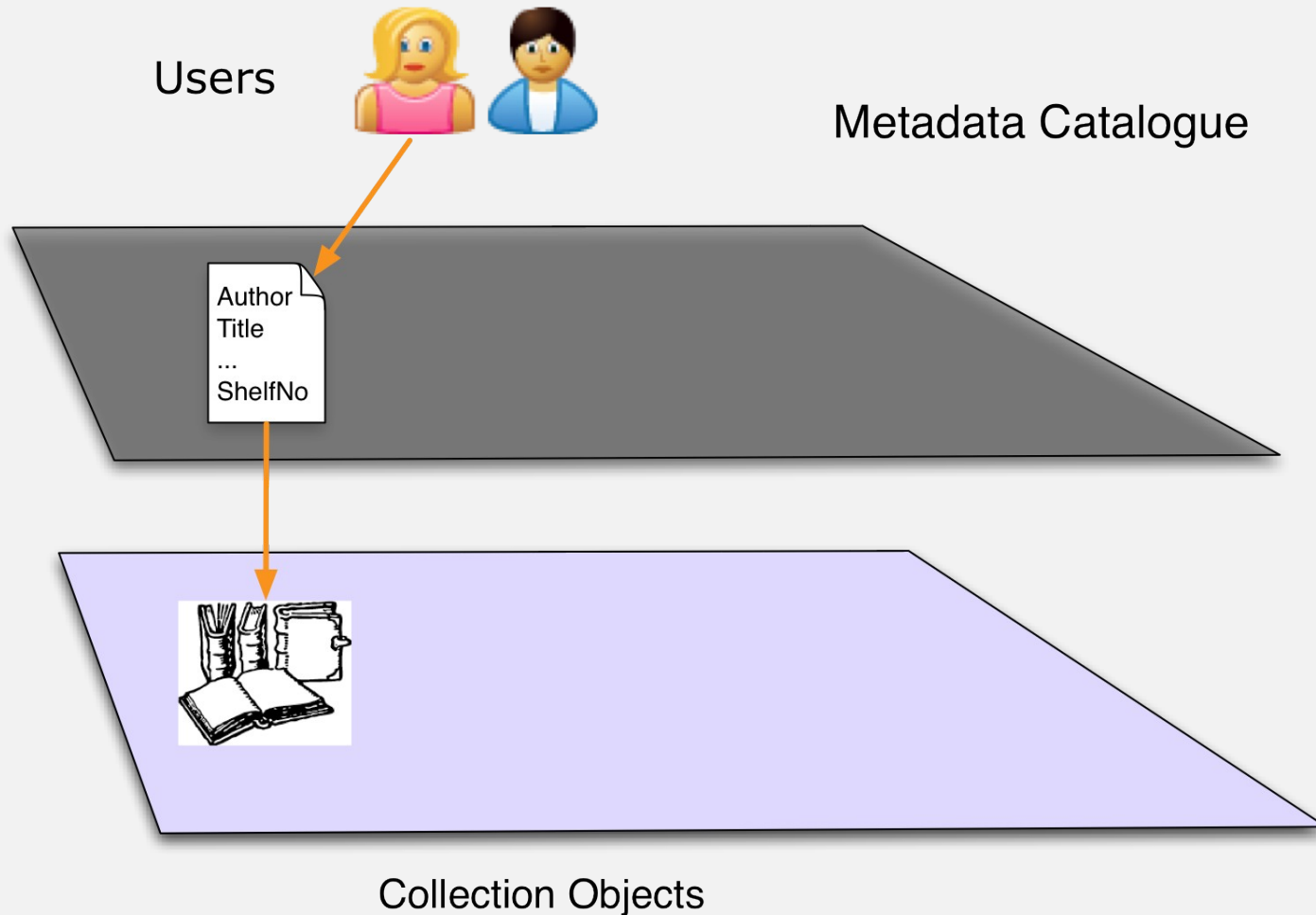
The Gutenberg Parenthesis Opens ...

Dissociation of container and content in the print paradigm

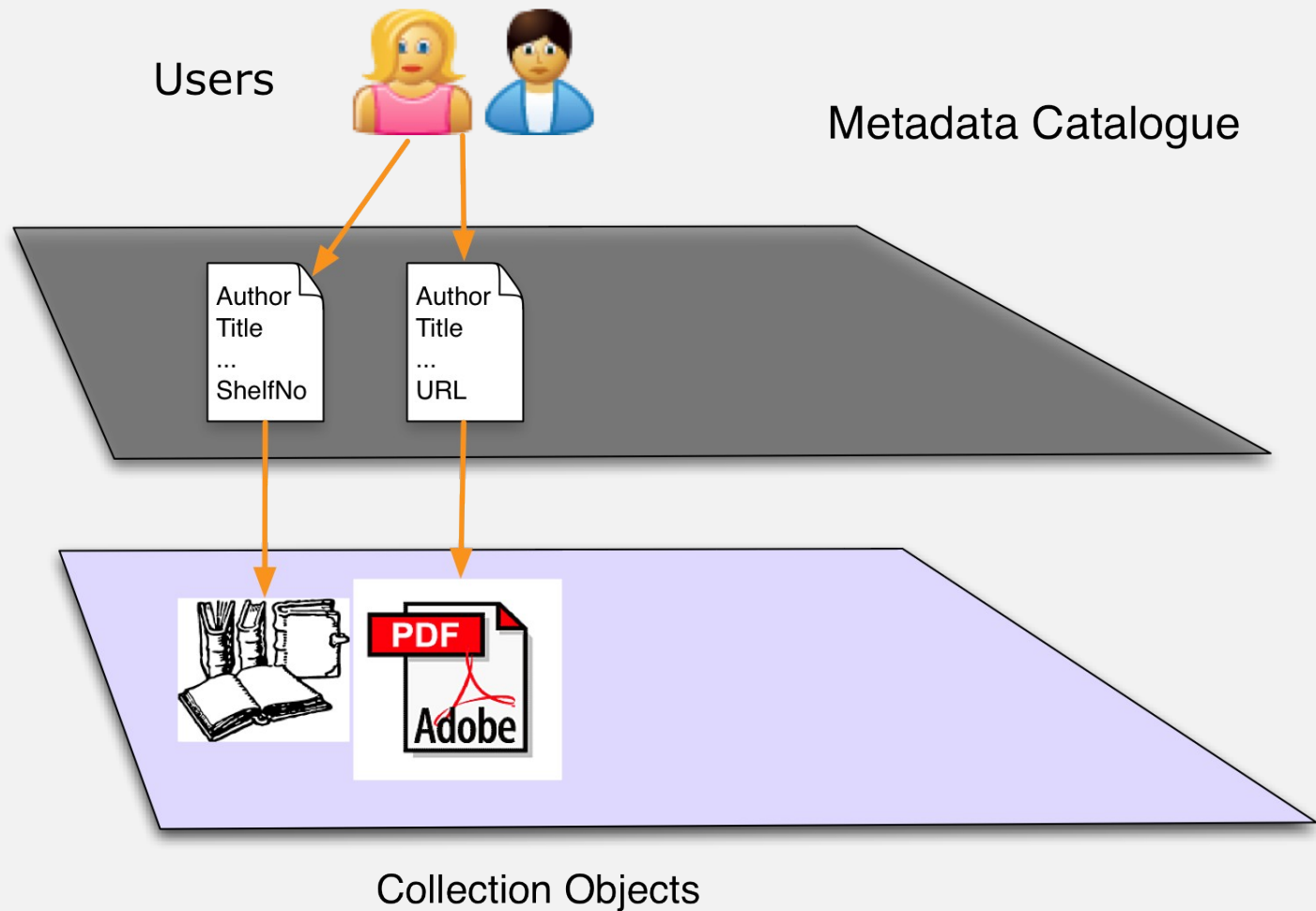
Dissociation of Roles in the Gutenberg galaxy



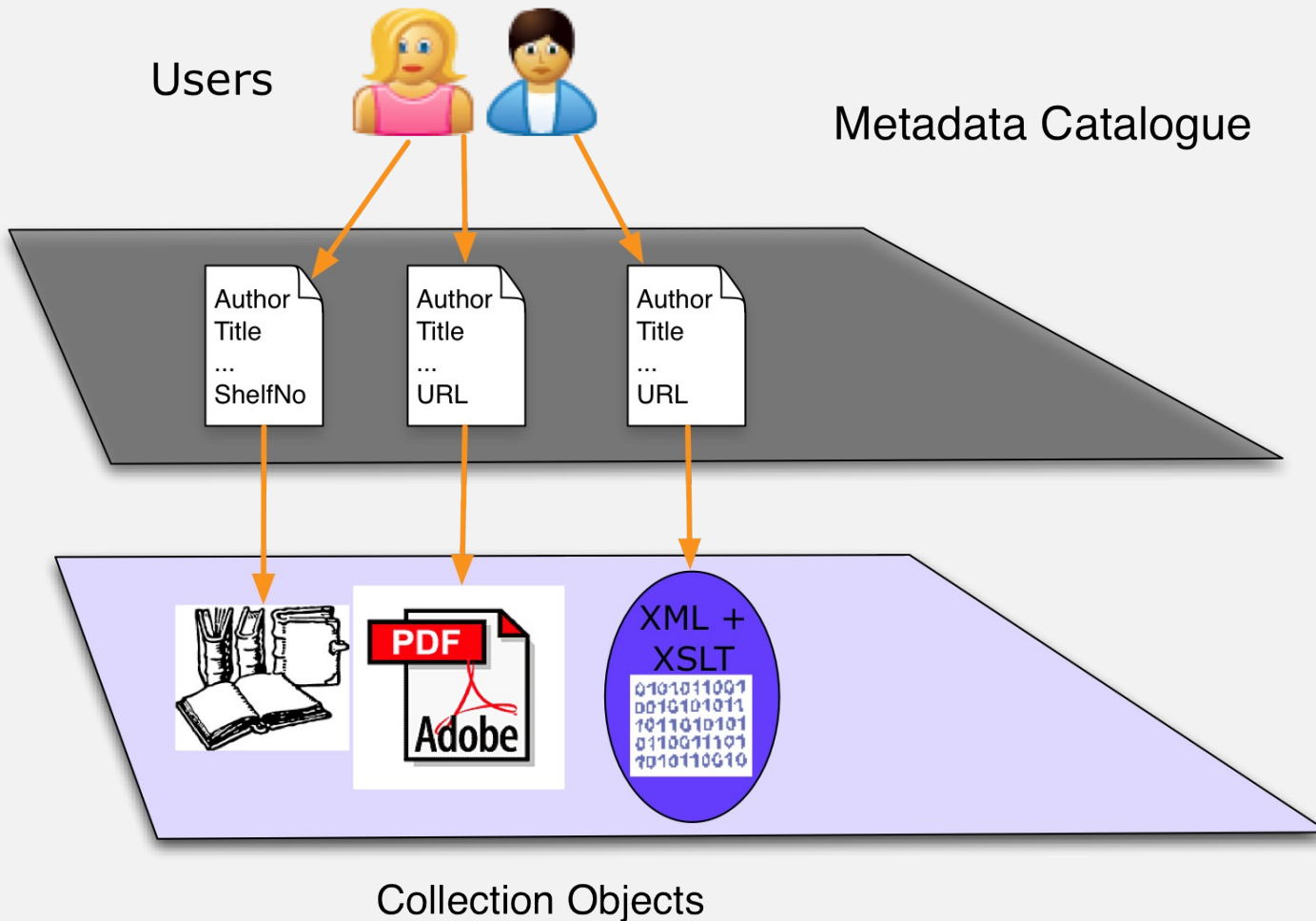
Catalogue Based Library Functional Axioms (1)



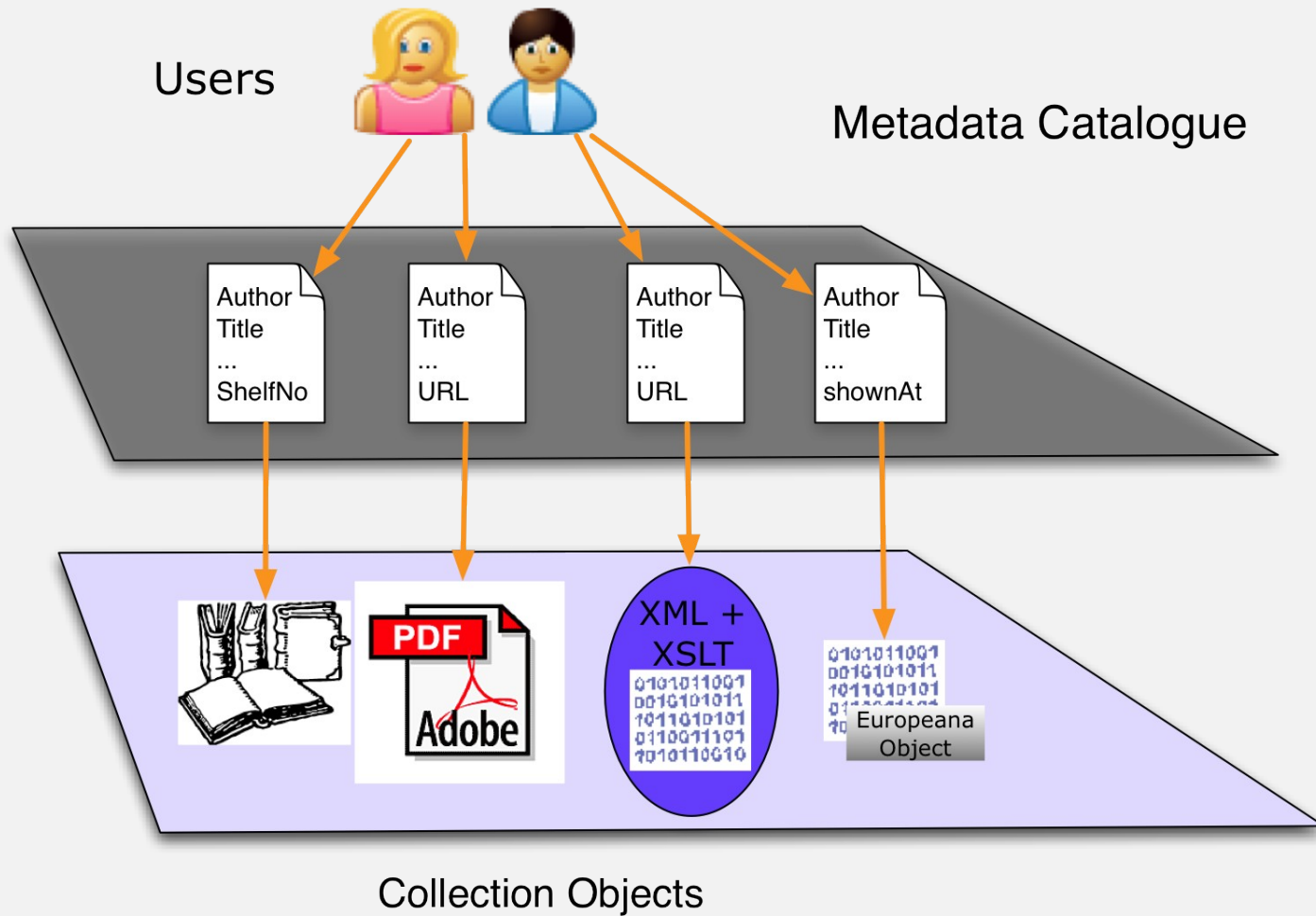
Catalogue Based Library Functional Axioms (2)



Catalogue Based Library Functional Axioms (3)



Catalogue Based Library Functional Axioms (K) LEUVEN



- **Mediating access** to information objects via **catalogues**
- **Mediating links** as pointers from metadata to objects
- Objects are part of a library **collection**
 - An object to be used within a library typically is part of this library's collection
- Internal processing logic: focus on
 - objects as information **containers**,
 - not so much on the **content** of these containers
 - and accordingly **cataloguing** is focussed on **container attributes**
- Functional macro-primitives are **ingestion, storage, description** and **retrieval** of information containers

... and examples: metadata records

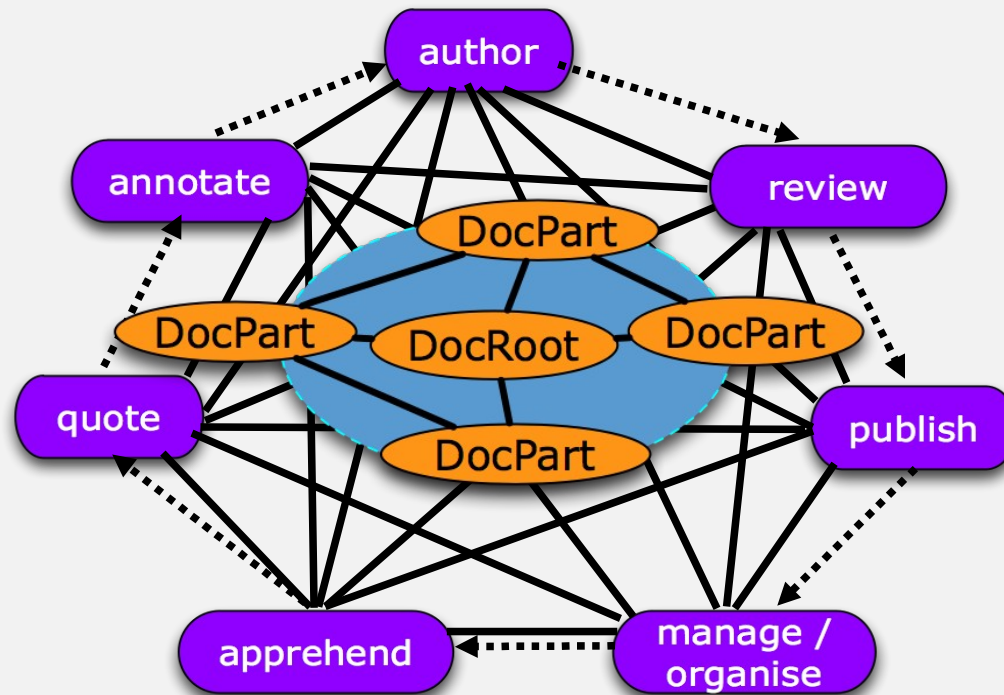
- <http://lccn.loc.gov/72083804>
- <http://lccn.loc.gov/00711195>
- <http://catalogue.bnf.fr/ark:/12148/cb34605779c>
- <http://d-nb.info/574200282>

... and closes again

The end of the print paradigm

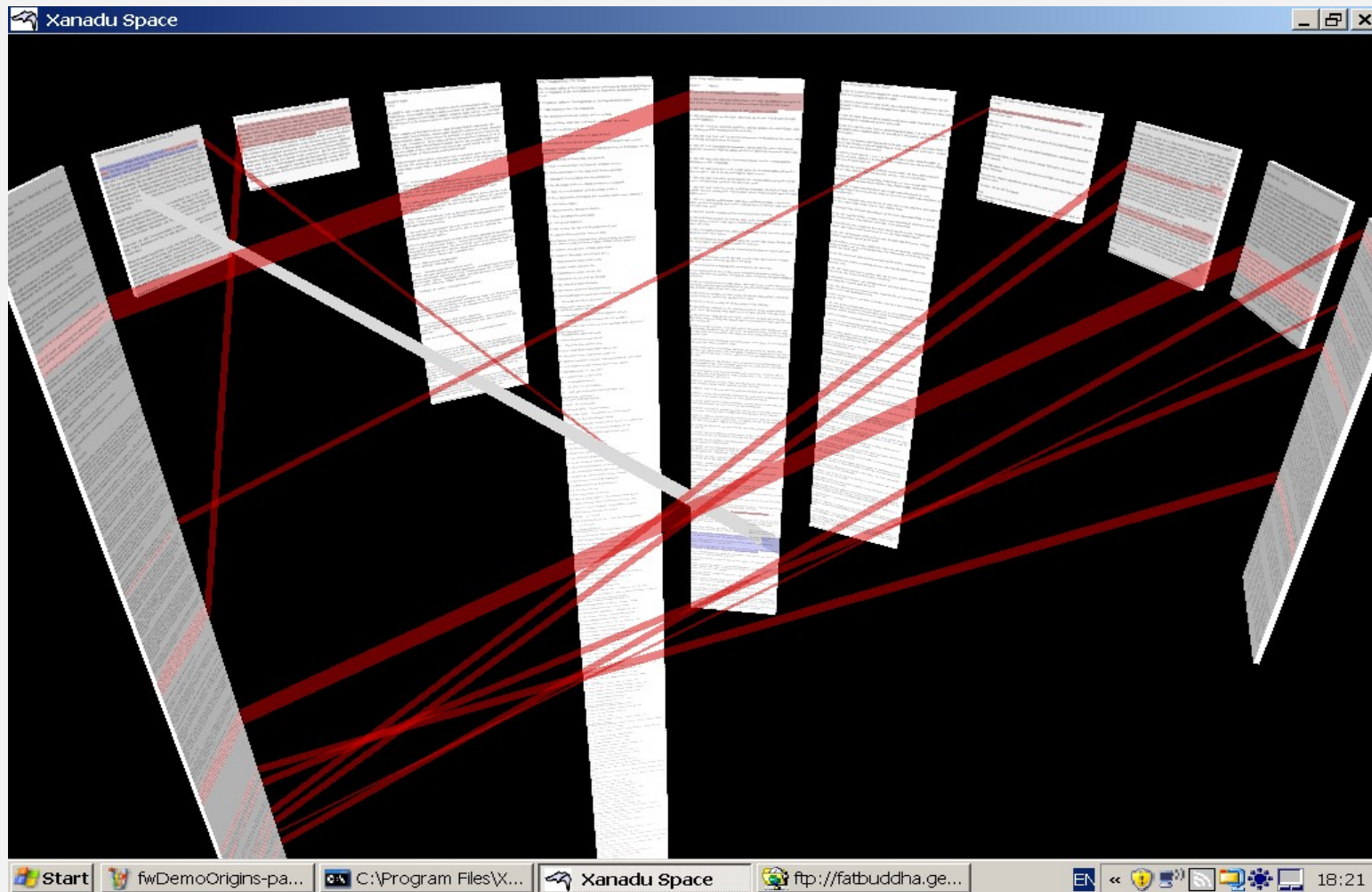
Web Based Scholarly Working Continuum a triple paradigm shift: Beyond Documents

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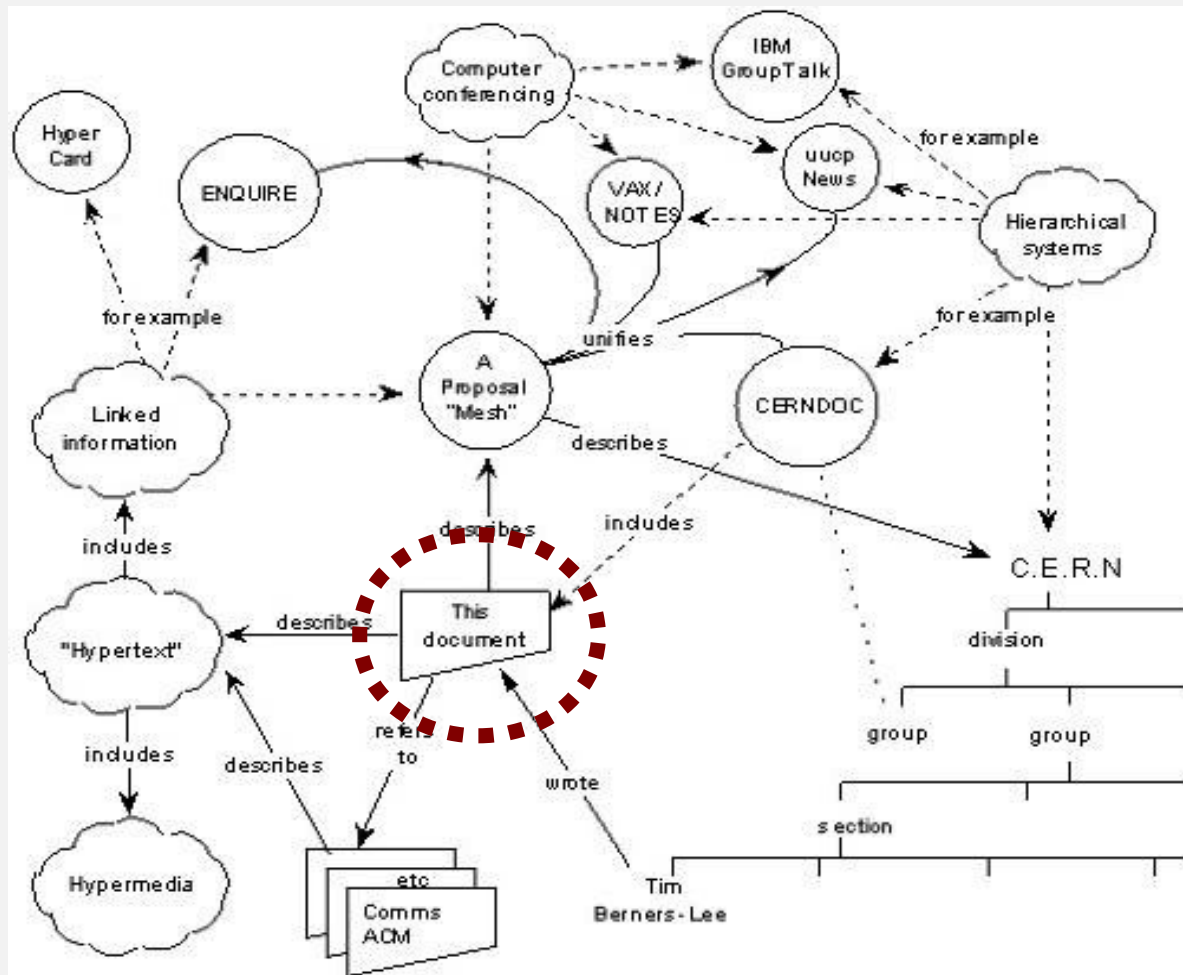


- Decreasing functional determination by traditional cultural techniques
- Disintegration of the linear / circular functional paradigm
- Erosion of the monolithic document notion in hypertext paradigms

Ted Nelson's Xanadu: radicalised Hypertext ...



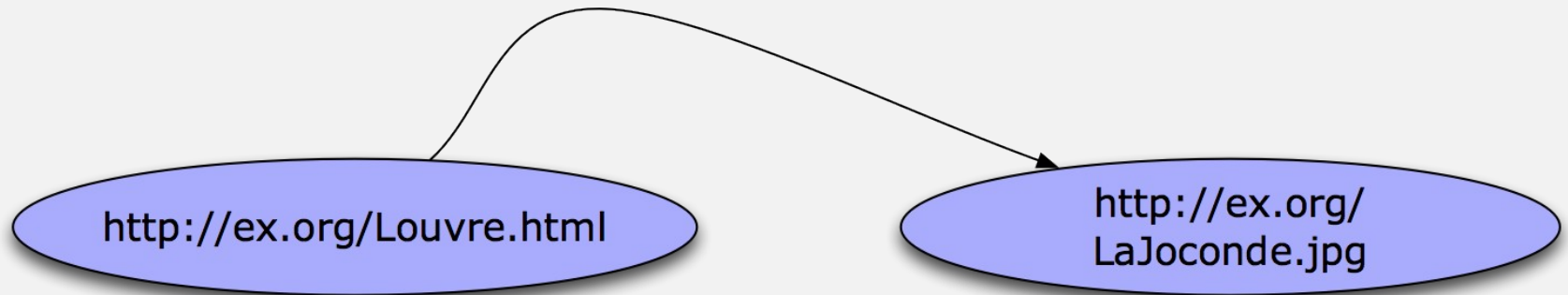
The Web of Documents



Information Management:
A Proposal
(TBL, 1989)

... twice
extended:
• in syntax
• in scope

Resources and Links in the Document Web

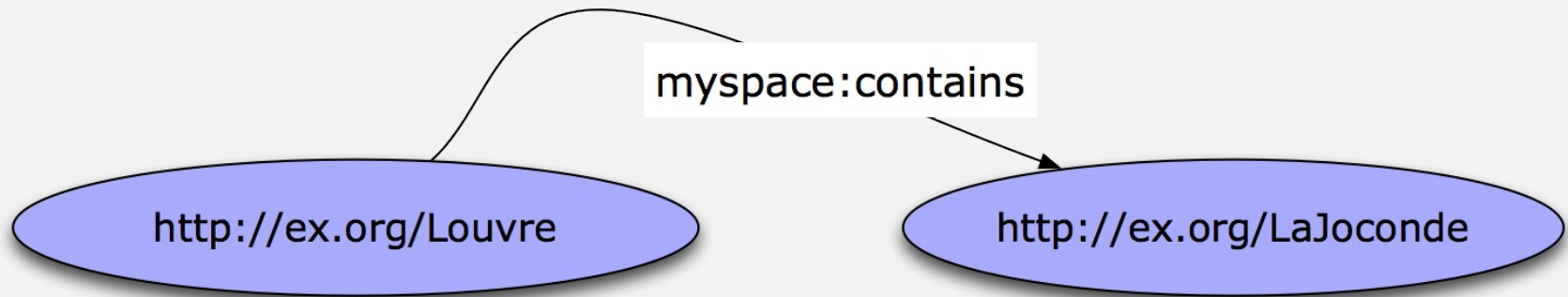


```
<a href="http://ex.org/LaJoconde.jpg">b</a>
```

- We have HTTP URIs to identify resources and links between them – but we are missing a few things!
- What kinds of resources are 'Louvre.html' and 'LaJoconde.jpg'?
 - A machine cannot tell.
 - Humans can: we recognize implied context!
- How exactly do they relate to each other?
 - A machine cannot tell.
 - Humans can: again we recognize implied context!

Syntactically Extending the Document Web (1)

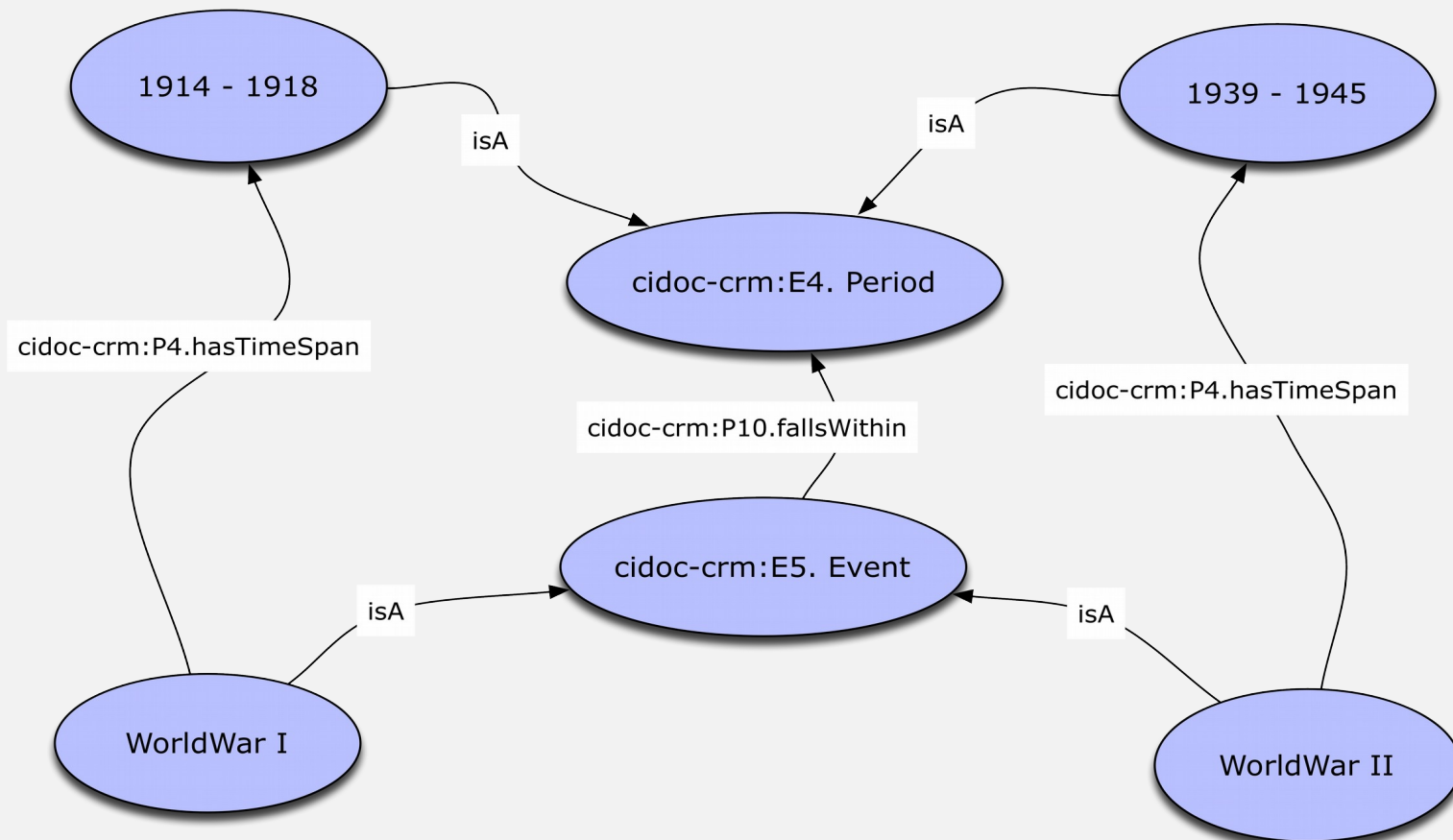
- We add a syntax for making statements on resources: RDF triples



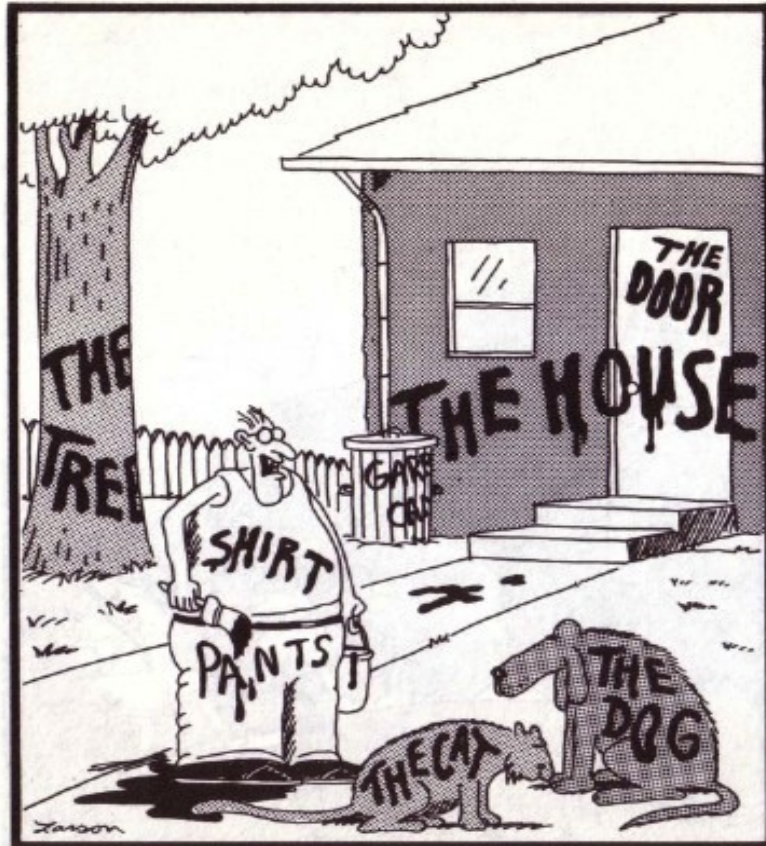
- We add a schema language (RDFS) with elements such as
 - classes ('chair' as instance of chairs),
 - hierarchies of classes and properties (chairs are a subclass of furniture, 'teaches' is a sub-property of 'communicates')
 - inheritance (communication based on language → teaching also is)
 - support for basic inferencing, deterministic logical operations

Syntactically Extending the Document Web: RDF (2)

- And thus are able to establish structures in triple aggregations resulting in lightweight domain ontologies:



Extending the Web in Scope: The Web of Things ... (slightly Mistaken)

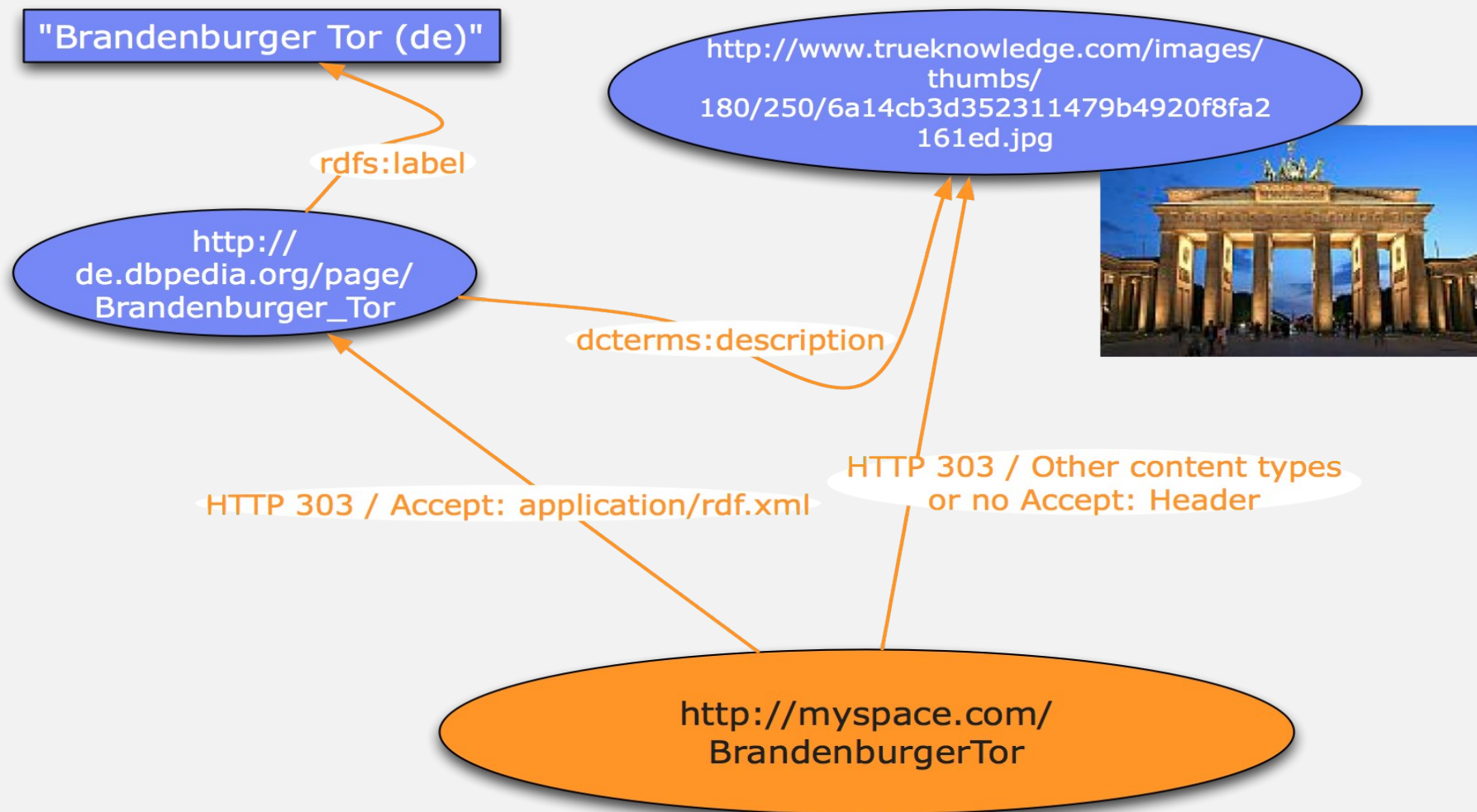


"Now! ... That should clear up
a few things around here!"

What's **wrong**
with this picture?

Taken from Ronald Carpentier's
Blog at
<http://carpentier.wordpress.com/2007/08/08/1-2-3/>

... and the Way we extend the Web in scope to make it a 'Web of Things'



And we get ... Linked Data

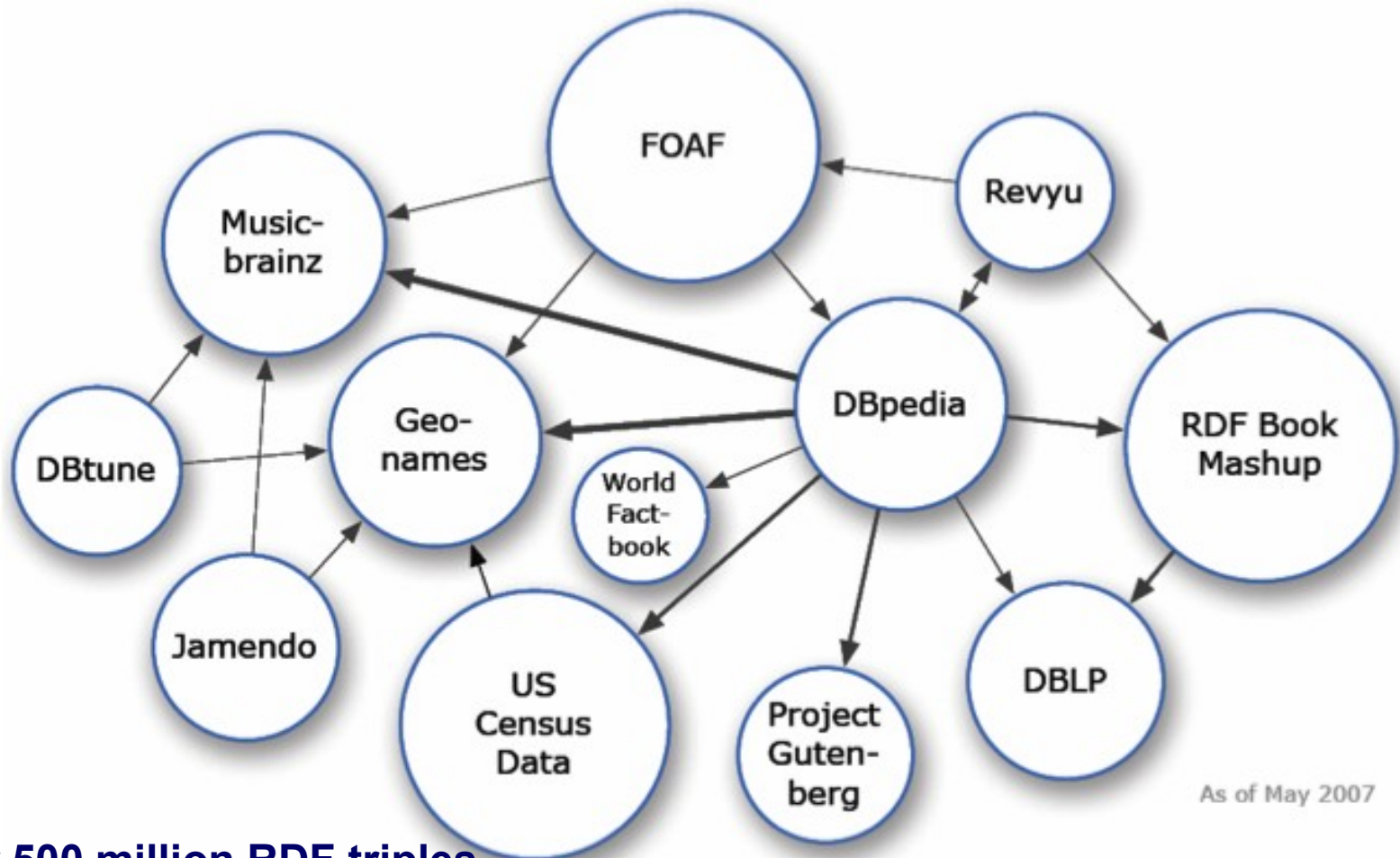
Linked Data essentials

1. Use URIs Standard **Identifiers**
 2. Use HTTP URIs Standard **Pointers**
 3. Serve useful information using SPARQL, RDF standards
 4. Mention URIs of related objects Standards for **Queries** and **Statements**
- Link** to Context

Copyright © 2008 W3C (MIT, ERCIM, Keio)

[http://www.w3.org/2008/Talks/0617-lod-tbl/#\(4\)](http://www.w3.org/2008/Talks/0617-lod-tbl/#(4))

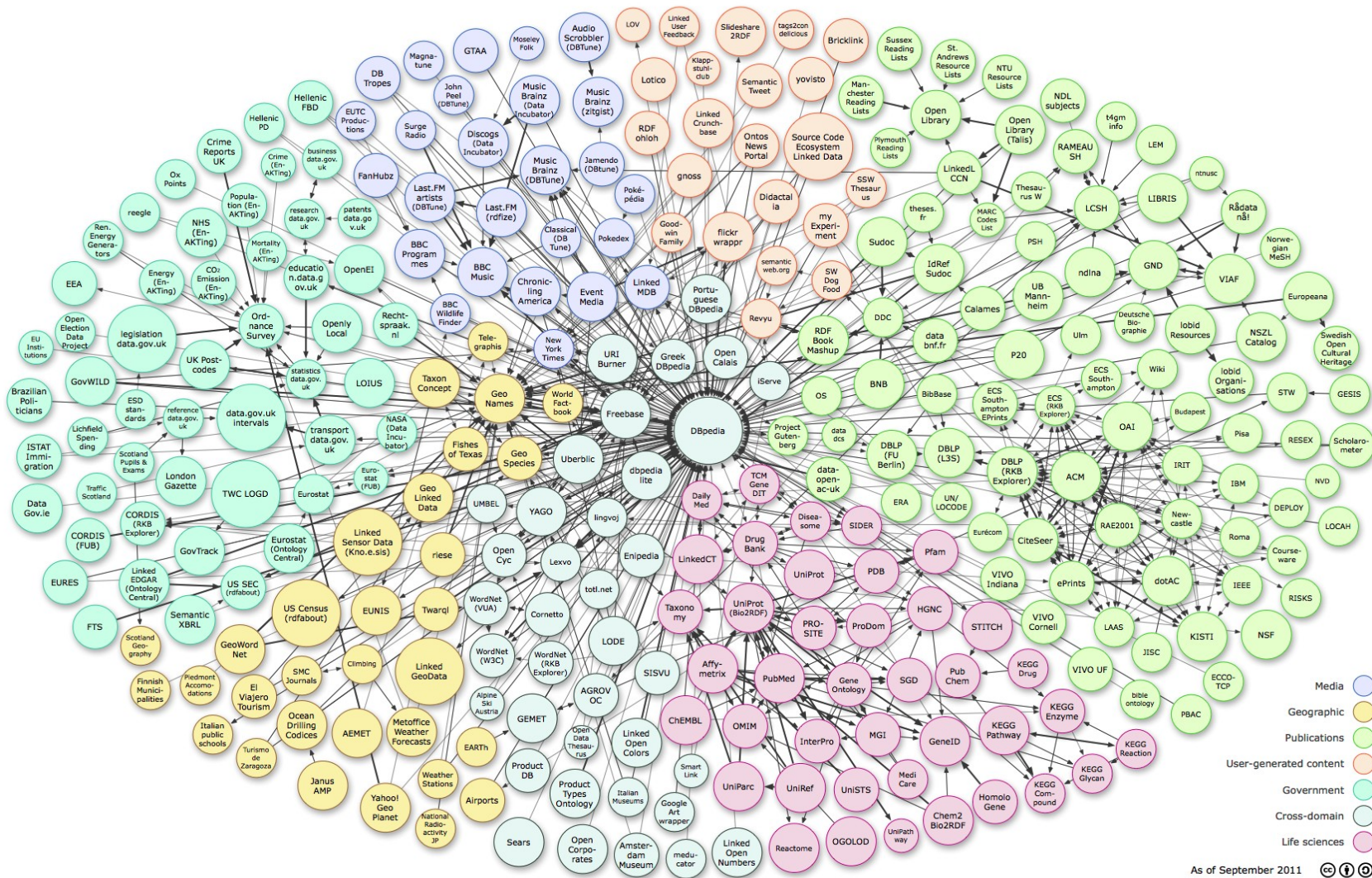
A few Bubbles: 5/2007



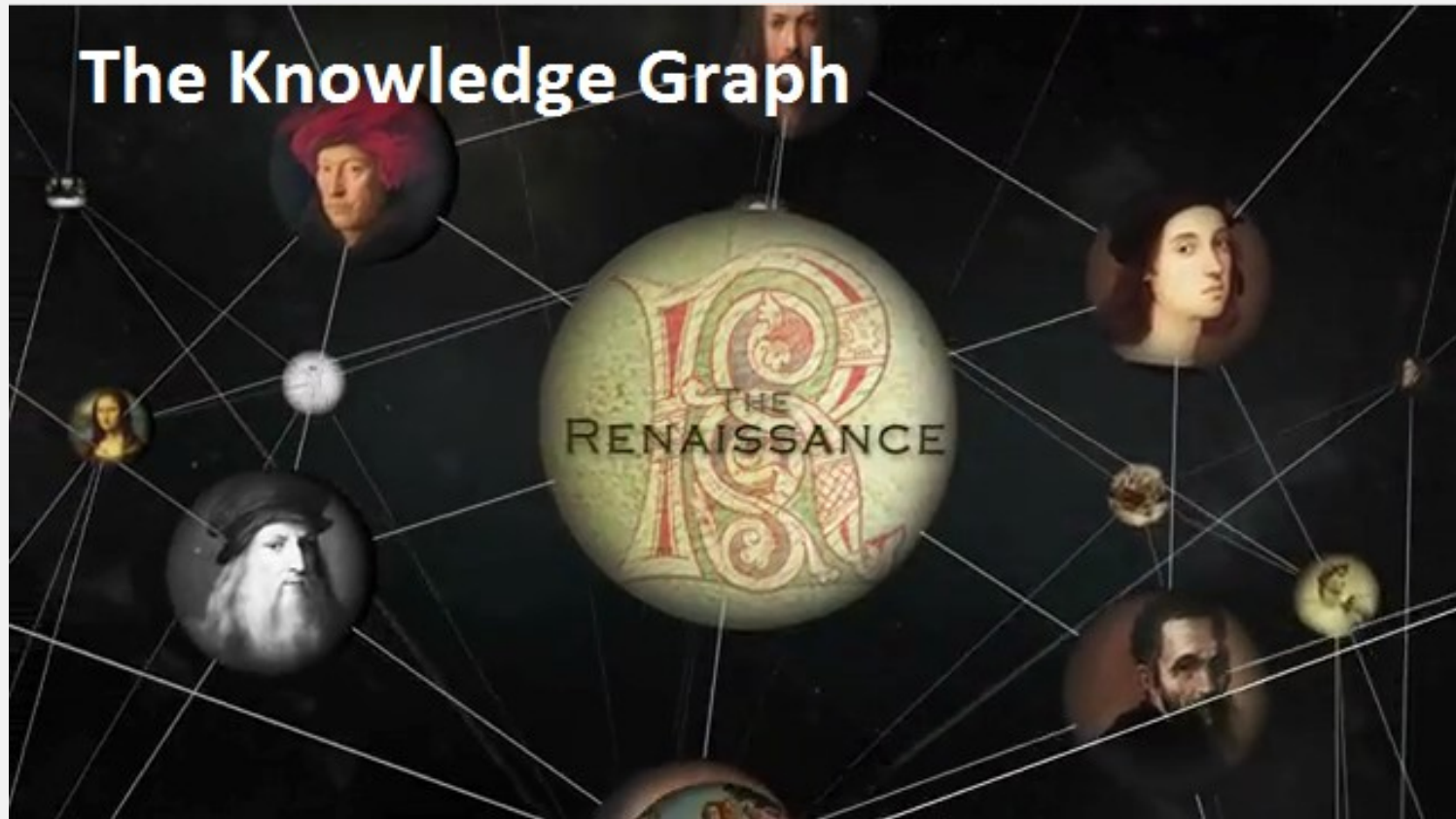
- Over 500 million RDF triples
- Around 120,000 RDF links between data sources

© Richard Cyganiak

And a lot of Bubbles as of last Year

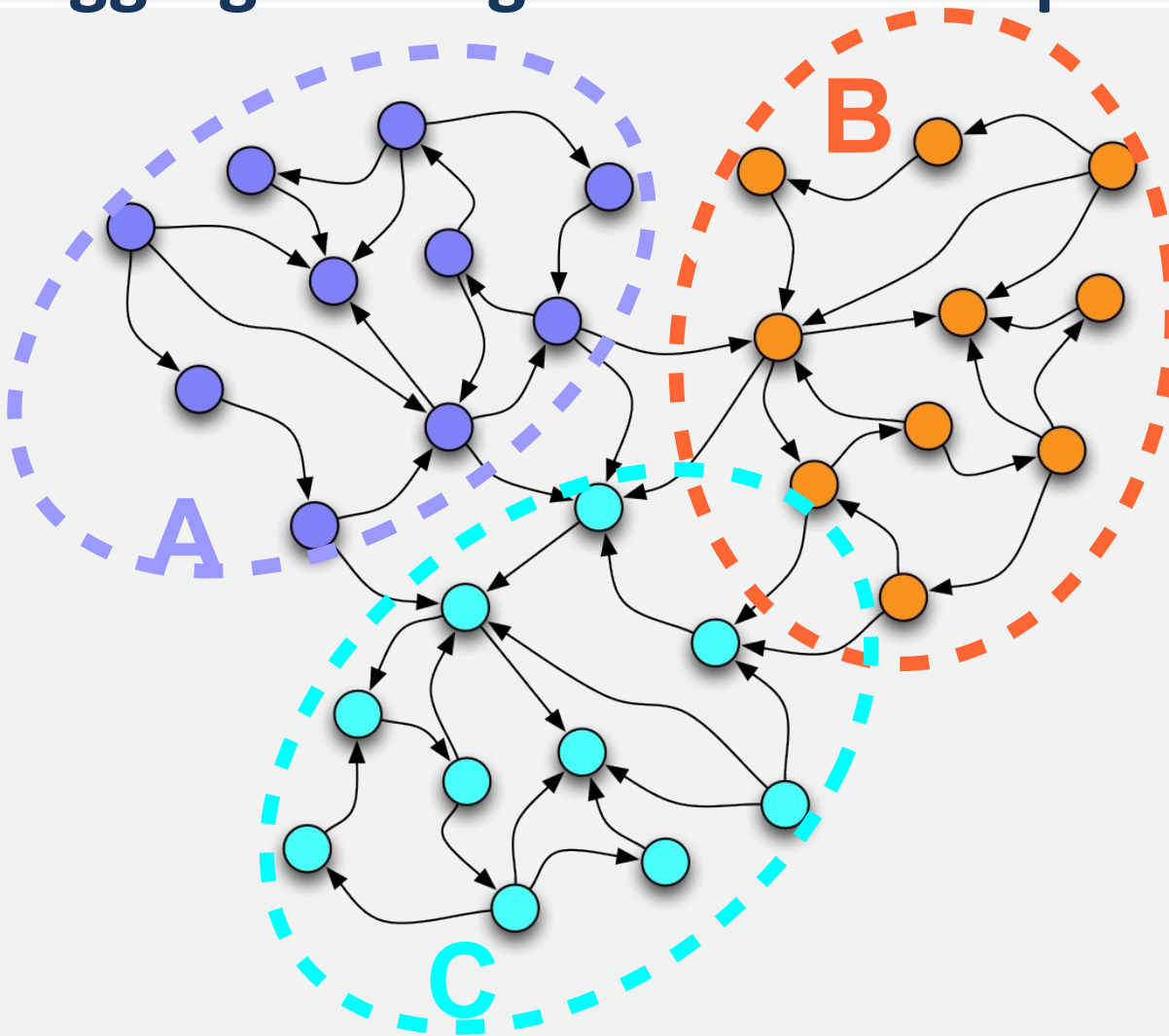


Google entering the Floor



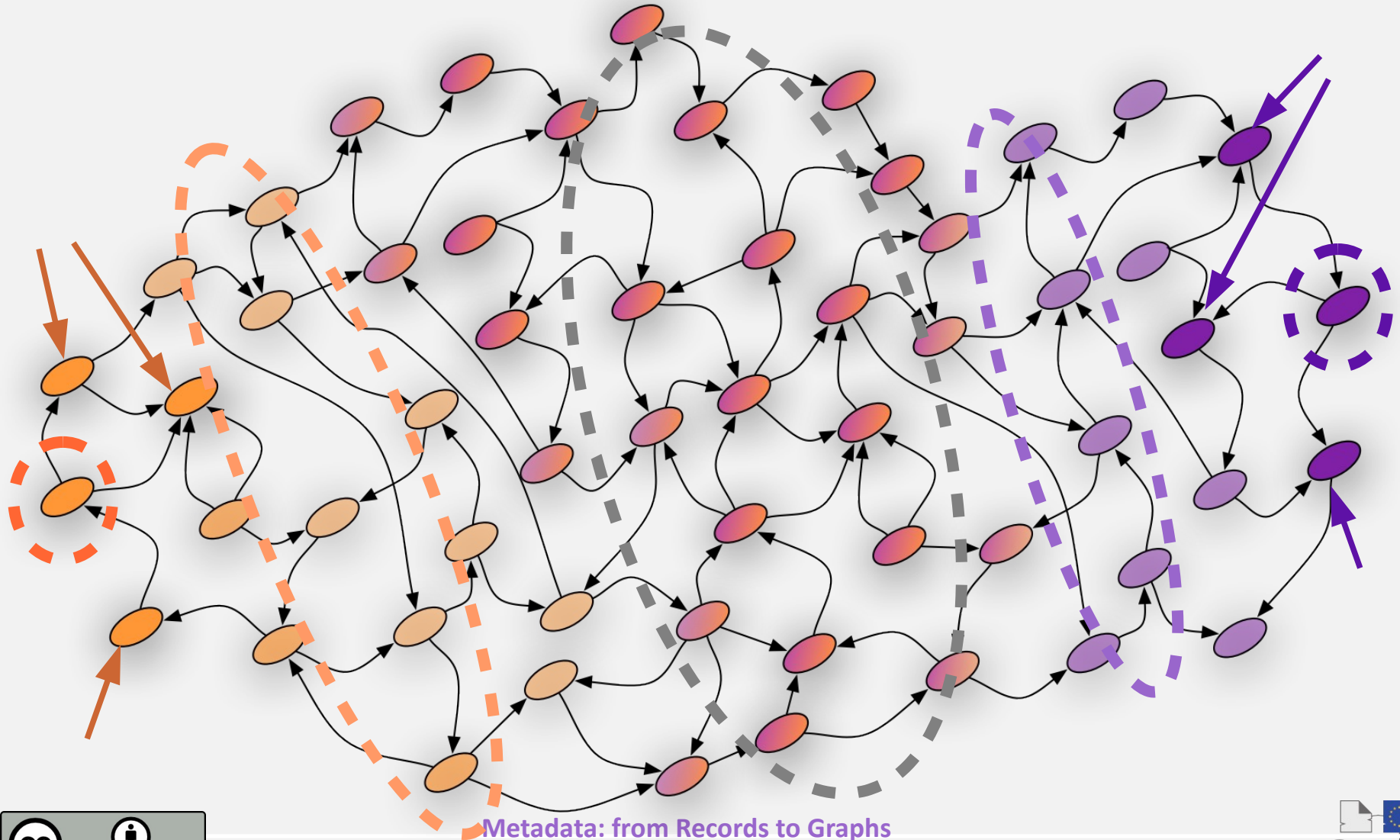
Modelling Object Representations as RDF

Aggregations generates new questions ...



- Where do resource aggregations 'start'? Where do they 'end'?
- And what constitutes document boundaries??
- And which node was connected to which one at a given time???
→ Provenance, Versioning, Authorisation: Named Graphs

Aggregations and Context: Calculating Closeness

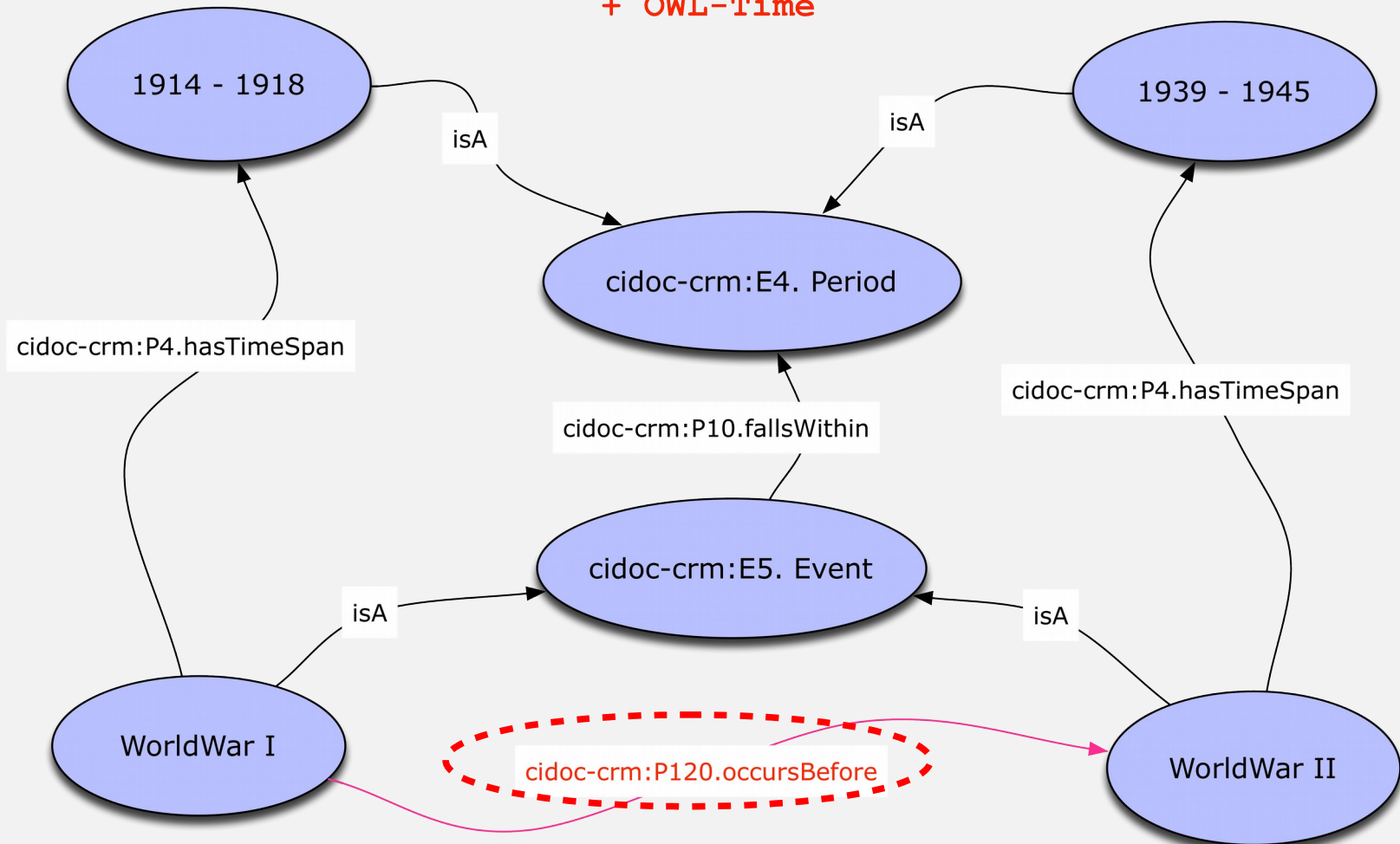


Metadata: from Records to Graphs

Stefan Gradmann, OAI8, Genève, 19/06/2013

... and new opportunities: Triple Sets and 'Reasoning'

+ OWL-Time



... based on 'Documents' as Aggregations of RDF-Triples (1)

Assertion

NG_000007.
3:g.70628G>A

has
frequency

0.25%

Condition

Sardinian

Provenance

Giardine et al

'Documents' as Aggregations of RDF-Triples (2)

```
<nanopublication id="0">
```

```
<assertion>  
  <subject>NG_000007.3:g.70628G>A</subject>  
  <predicate>has variant frequency</predicate>  
  <object>0.25%</object>  
</assertion>
```

```
<condition>Sardinian</condition>
```

```
<provenance>  
  <dateofcreation>March 24, 2011</dateofcreation>  
  <lastedit>March 24, 2011</lastedit>  
  <evidenceType>empirical</evidenceType>  
  <authorID>Giardine et. al.</authorID>  
  <curatorID>unresolved</curatorID>  
  <registrantID>Mons et. al.</registrantID>  
  <PMID>6695908</PMID>  
  <PMID>1428944</PMID>  
  <PMID>1610915</PMID>  
  <DOI>http://dx.doi.org/10.1038/ng.785</DOI>  
  <linkout>http://globin.bx.psu.edu/cgi-bin/hbvar/query_vars3?  
mode=output&display_format=page&i=239</linkout>  
  <linkout>http://phencode.bx.psu.edu/cgi-bin/phencode/phencode?  
build=hg18&id=HbVar.239</linkout>  
</provenance>
```

```
<nanopublication id="0">
```


The use of Inferences

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van Haagen HHHBM, 't Hoen PAC, Botelho Bovo A, de Morrée A, van Mulligen EM, et al. (2009) Novel Protein-Protein Interactions Inferred from Literature Context. PLoS ONE 4(11): e7894. doi:10.1371/journal.pone.0007894 / Example provided by Jan Velterop

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RESEARCH ARTICLE OPEN ACCESS

Novel Protein-Protein Interactions Inferred from Literature Context

Article Metrics Related Content Comments: 0

Herman H. H. B. M. van Haagen^{1*}, Peter A. C. 't Hoen¹, Alessandro Botelho Bovo², Antoine de Morrée¹, Erik M. van Mulligen¹, Christine Chichester¹, Jan A. Kors¹, Johan T. den Dunnen¹, Gert-Jan B. van Ommen¹, Silvère M. van der Maarel¹, Vinícius Medina Kern², Barend Mons¹, Martijn J. Schuemie¹

1 Biosemantics Association, Department of Human Genetics, Leiden University Medical Center, Leiden, and Department of Medical Informatics, Erasmus University Medical Center, Rotterdam, The Netherlands, **2** Post-Graduate Program in Knowledge Engineering and Management (EGC), Federal University of Santa Catarina (UFSC), Florianópolis, Brazil

Abstract [Top](#)

We have developed a method that predicts Protein-Protein Interactions (PPIs) based on the similarity of the context in which proteins appear in literature. This method outperforms previously developed PPI prediction algorithms that rely on the conjunction of two protein names in MEDLINE abstracts. We show

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[Author Contributions](#)
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Data = Publication

- Distinction data vs. publication will get **increasingly obsolete** in semantic publishing environments ...
- ... at least in the STM sector.
- The move into semantic publication will be **much slower in the SSH** because of
 - fuzzy and unstable **terminology**
 - fuzzy **linking semantics** hard to formalise consistently
 - close relation between **complex document formats** and **scholarly discourse**
- Current examples are mostly from the medical and bio-medical area as a consequence
- We are exploring potential of change in the SSH in

→ Much more than catalogues: Visualise and Explore Cultural Context

- Mapping the Republic of Letters:

<http://knot-dev.herokuapp.com/investigate.html>

- Or again the graph of writers and thinkers and how they are connected:

<http://zoom.it/Vj6F> (is this one really useful?)

<http://bgriffen.scripts.mit.edu/www/media/json/thinkers/>

<http://mariandoerk.de/edgemaps/demo/>

<http://www.visualdataweb.org/refinder/refinder.php>

- Or again a Finnish example (Kulttuurisampo):

<http://www.kulttuurisampo.fi/kulsa/historiallisetKartat.shtml>

- Or finally Obama vs. Palin:

http://truthy.indiana.edu/memedetail?id=324&resmin=45&theme_id=4 vs.

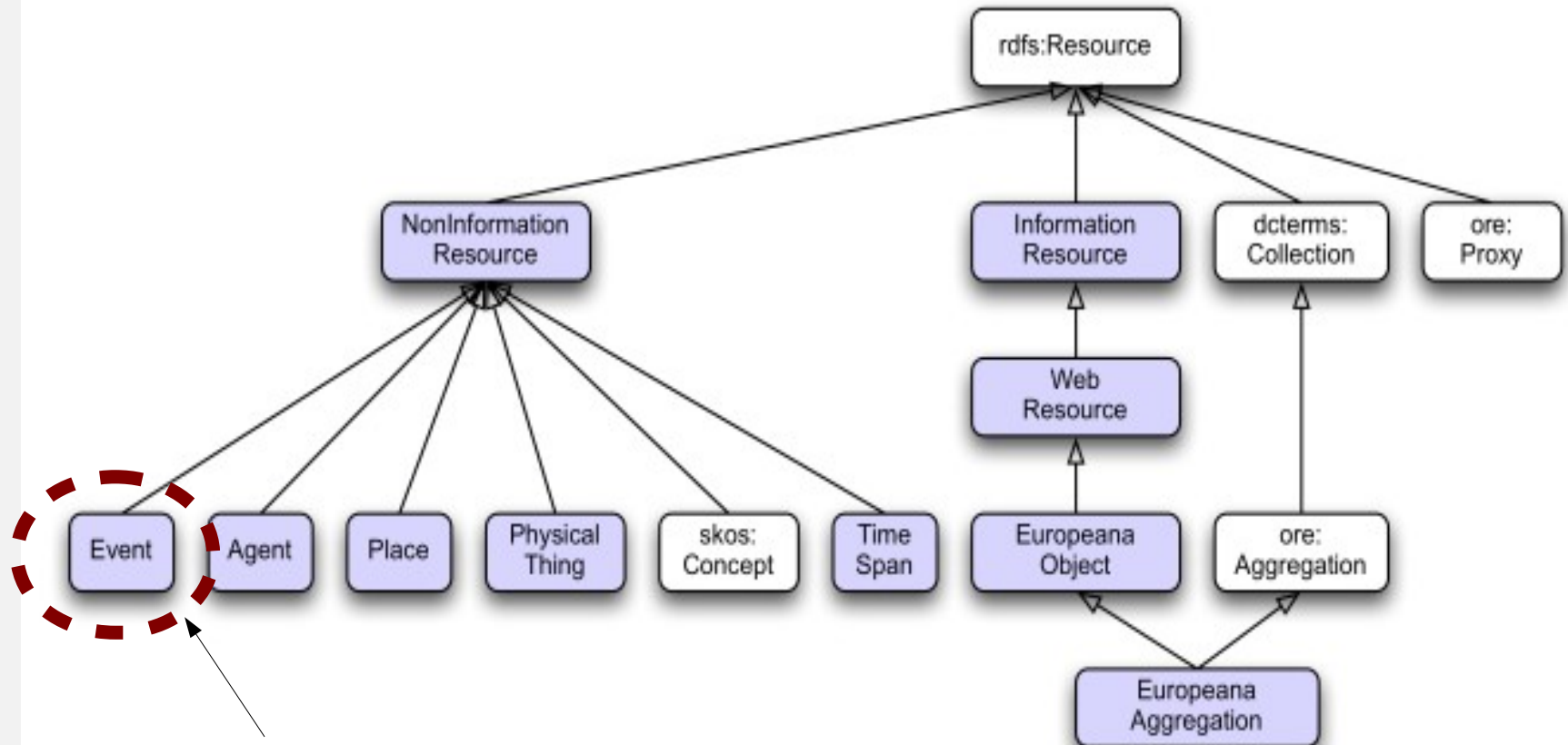
http://truthy.indiana.edu/memedetail?id=783&resmin=45&theme_id=4

The Europeana Data Model (EDM) in the LoD Context

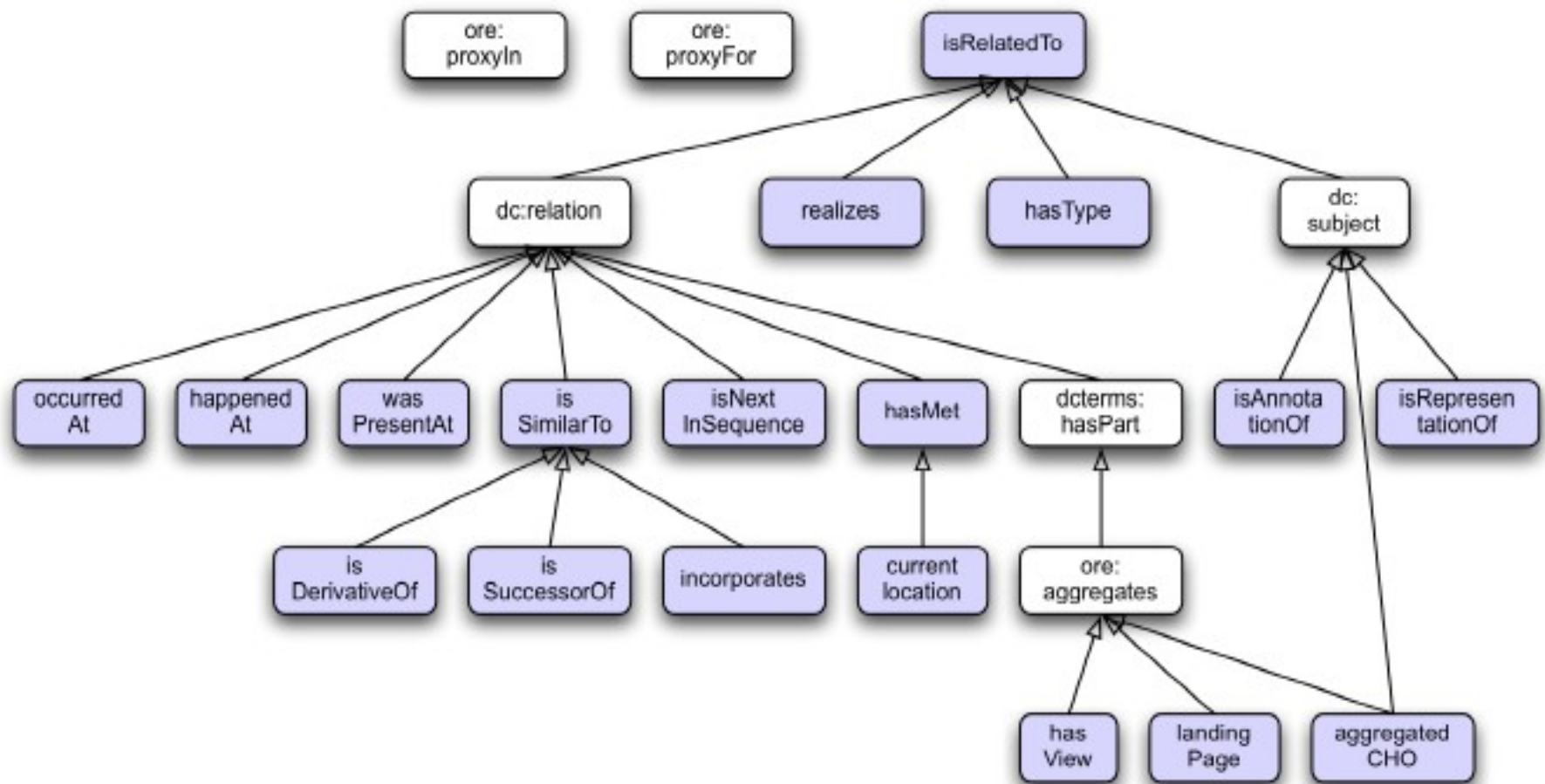
EDM – what is it?

And what not?

- EDM is the **metadata model** replacing the ESE ...
- ... a model for making statements about **digital representations** of cultural heritage objects
- ... a model for **contextualising** such representations
- EDM is **not an object model** (but might be combined with object and process models)!
- EDM is an **RDF based graph model**
- *EDM enables modeling of objects and context and thus **knowledge generation***



CIDOC CRM E5 hierarchy
could be pruned here



Mona Lisa: French Ministry of Culture

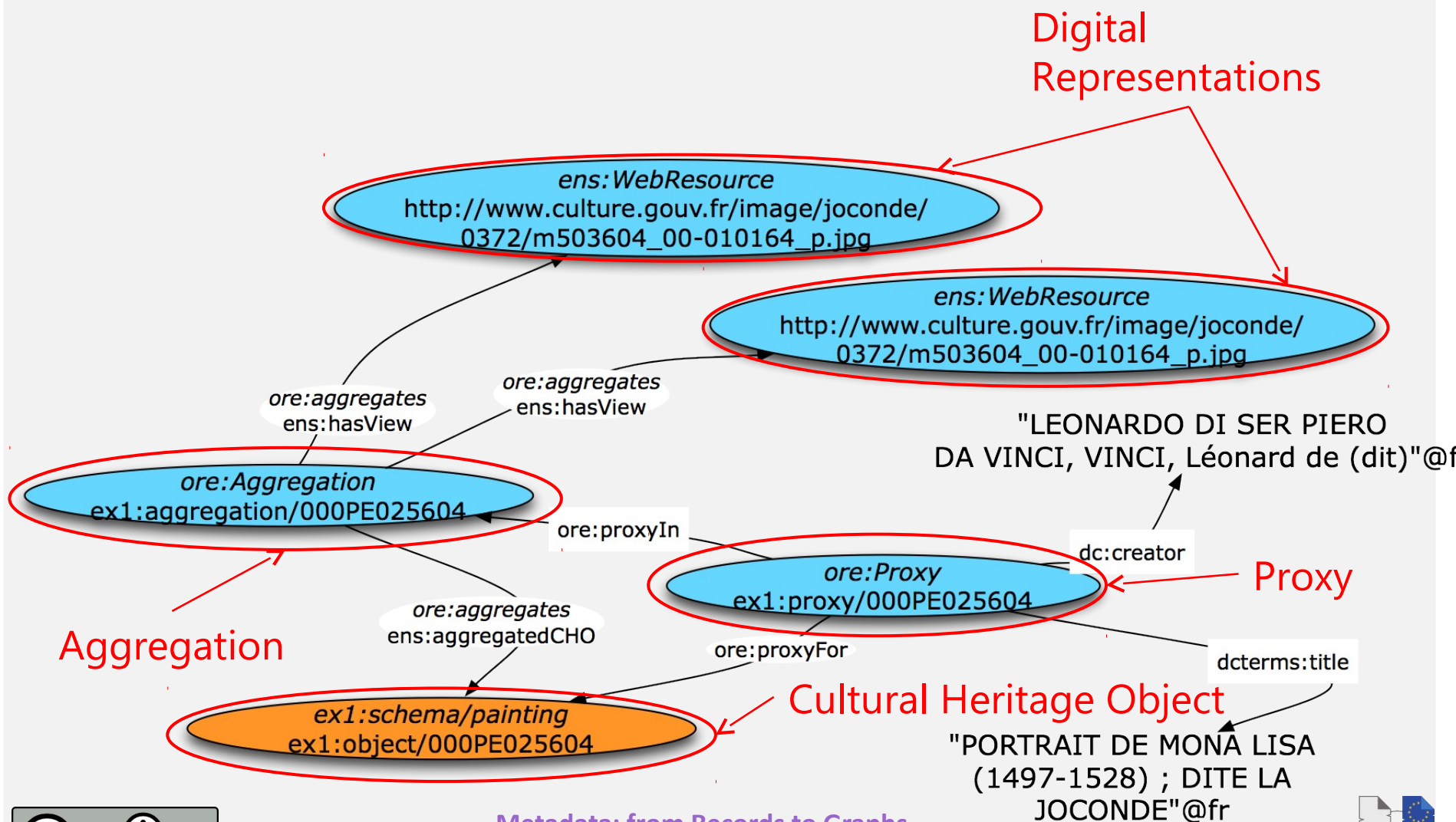
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Réponse n° 1



Domaine	peinture
Type d'objet	tableau
Titre	PORTRAIT DE MONA LISA (1479-1528) ; DITE LA JOCONDE
Auteur/exécutant	LEONARDO DI SER PIERO DA VINCI ; VINCI Léonard de (dit)
Précision auteur/exécutant	Vinci, 1452 ; Amboise, 1519
Ecole	Italie
Période création/exécution	1er quart 16e siècle
Millésime création/exécution	1503 entre ; 1506 et
Genèse	oeuvre en rapport ; reproduit en gravure
Historique	commandé par le florentin Francesco del Giocondo, époux de Mona Lisa entre 1503 et 1506 ; nombreuses copies dont une conservée au Louvre ; gravé par Fauchery, par Filhol, par Landon
Matériaux/techniques	peinture à l'huile ; bois
Mesures	77 H ; 53 L
Sujet représenté	portrait (Mona Lisa, femme, à mi-corps, de trois-quarts, assis, accoudé, loggia, Italien) ; fond de paysage (montagne, rocher, cours d'eau, pont, plaine, route)
Date sujet représenté	1479-1528
Lieu de conservation	Paris ; musée du Louvre département des Peintures
	 Musée de France au sens de la loi n° 2002-5 du 4 janvier 2002
Statut juridique	propriété de l'Etat ; musée du Louvre département des Peintures
Anciennes appartenances	François 1er ; Couronne de France
Numéro d'inventaire	INV 779
Commentaires	légère diminution du tableau sur les côtés (environ 7 mm) ; acheté vraisemblablement vers 1519, après la mort de l'artiste
Bibliographie	HEYDENRICH 6 ; OTTINO DELLA CHIESA 31 ; VILLOT I 484 ; HAUTECOEUR 1601 ; C.S.I. 1981, P 192
Copyright notice	© Musée du Louvre, © Direction des Musées de France, 1999
Crédits photographiques	© Réunion des musées nationaux ; © Hervé Lewandowski ; © Thierry Le Mage
	 commande reproduction et/ou conditions d'utilisation
	renseignements sur le musée
	000PE025604

Metadata Record in EDM

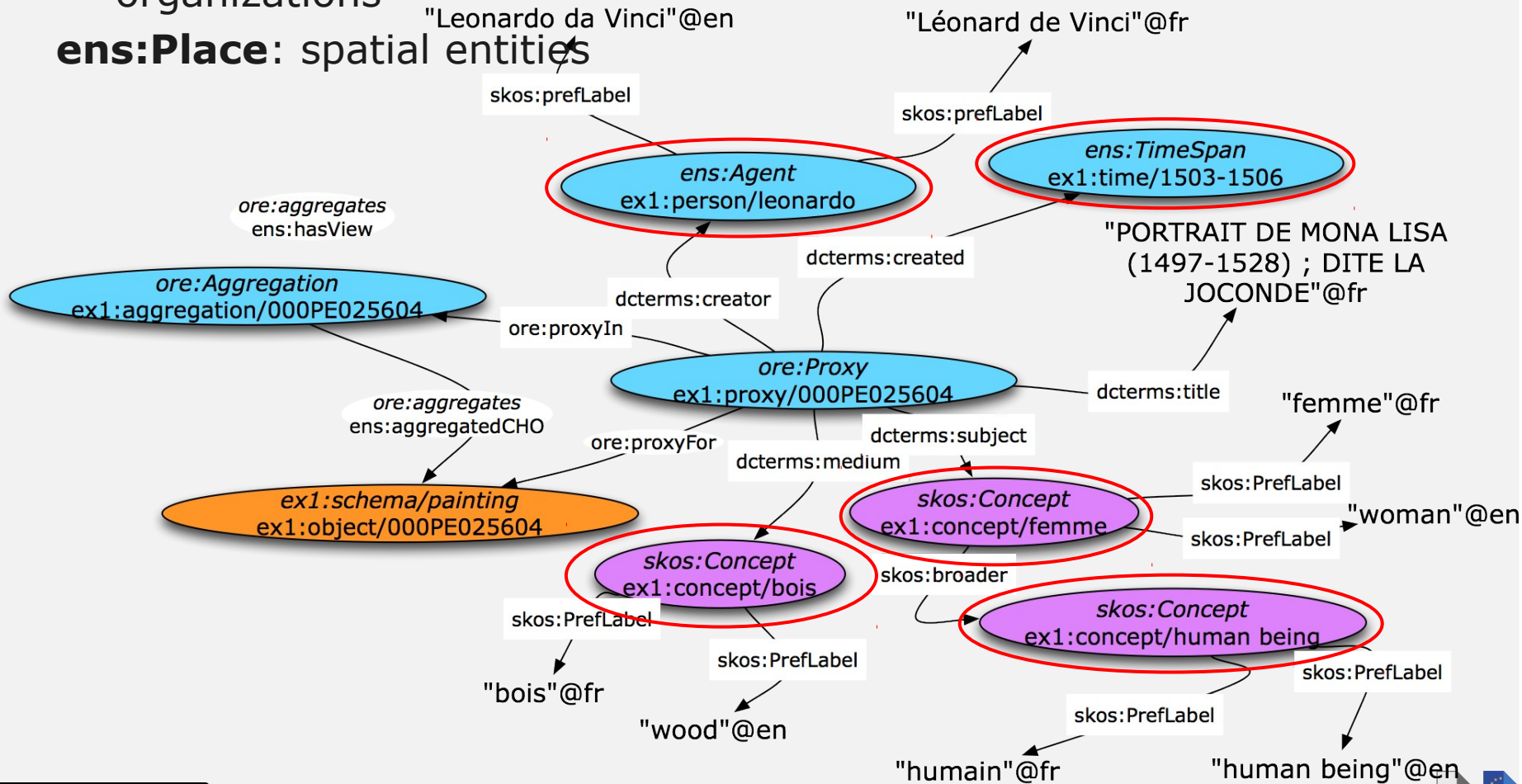


ens:Agent: persons or organizations

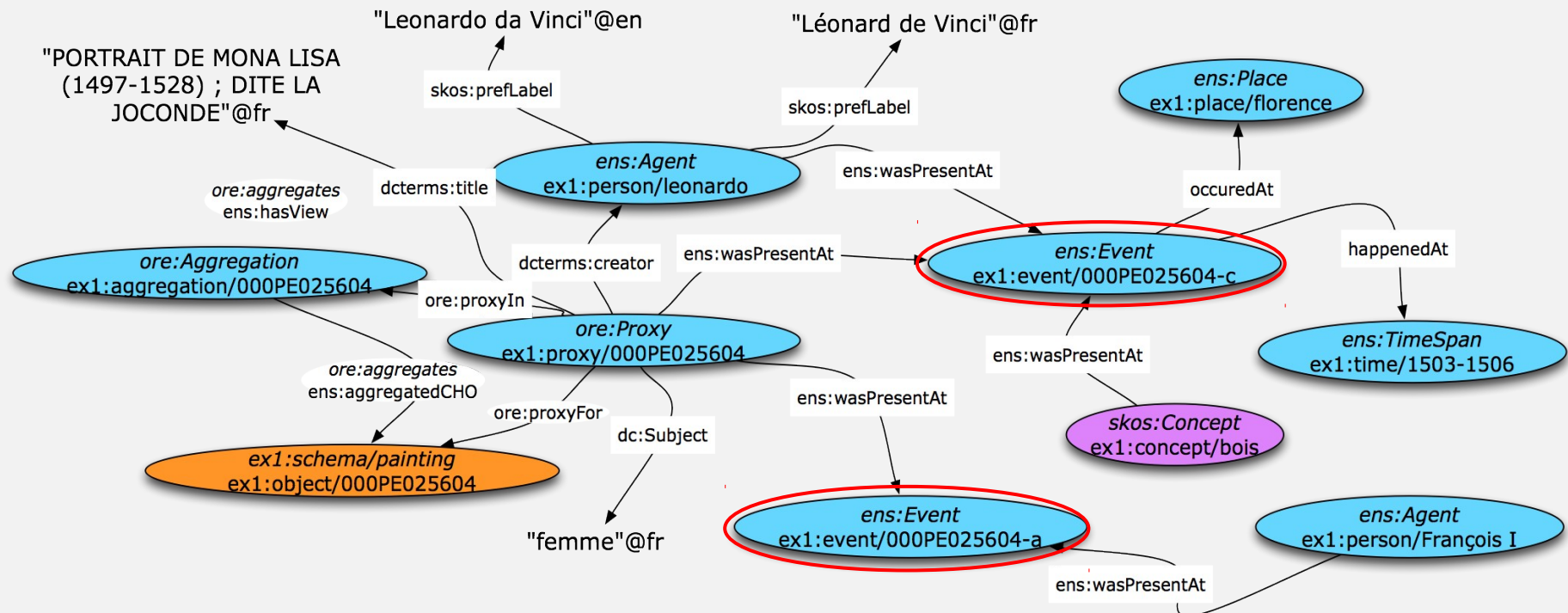
ens:Place: spatial entities

ens:TimeSpan: time periods or dates

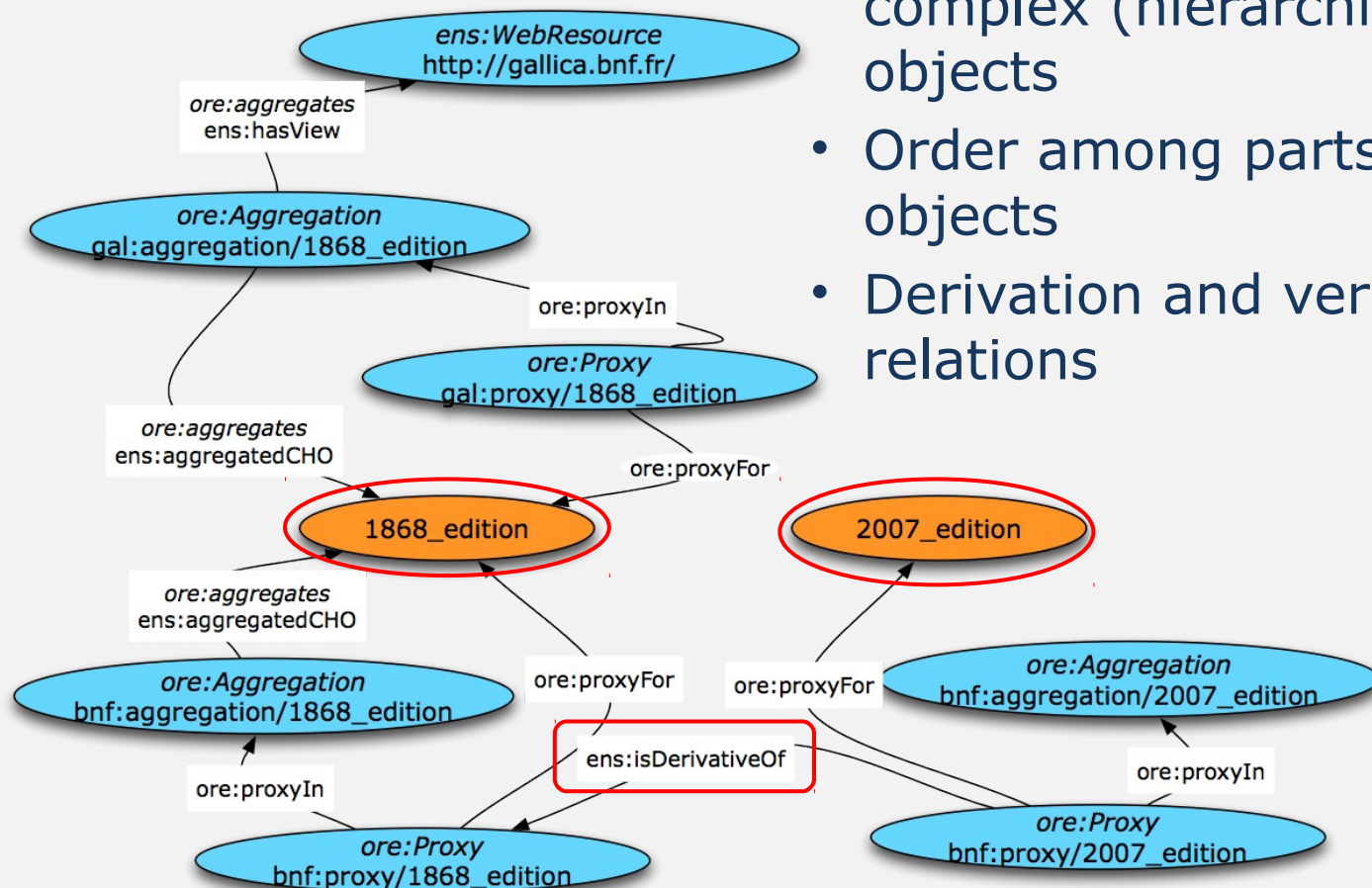
skos:Concept: entities from KOS



Preserving and exploiting original data also means being compatible with descriptions beyond simple object level (→ CIDOC CRM!)



- Part-whole links for complex (hierarchical) objects
- Order among parts of objects
- Derivation and versioning relations



Les Fleurs du Mal: UNIMARC

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<http://catalogue.bnf.fr/ark:/12148/cb37367035f>

```
000 nam 22 450
001FRBNF373670350000003
009http://catalogue.bnf.fr/ark:/12148/cb37367035f
039 $oGEA$a000288182
100 $a19920409d1857 m y0frey50 ba
1010 $afre
102 $aFR
105 $a||||z 00|||
106 $ar
2001 $a^Les %fleurs du mal$bTexte imprimé$fpar Charles
Baudelaire
210 $aParis$cPoulet-Malassis et De Broise$d1857
215 $a248 p.$d19 cm
676 $a841.8$v22
686 $a840$2Cadre de classement de la Bibliographie nationale
française
700 |$311890582$aBaudelaire$bCharles$4070
801 0$aFR$bBNF$c19920409$gAFNOR$2intermrc
```



Les Fleurs du Mal: Gallica

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<http://gallica.bnf.fr/ark:/12148/bpt6k70861t>

Gallica Consultation : Les fleurs du mal / par... page Non paginé of 258 (Display: Normal)

http://gallica.bnf.fr/ark:/12148/bpt6k70861t#

Home > Consultation

Les fleurs du mal / par Charles Baudelaire
Baudelaire, Charles, 1857
Full record
Display plain text

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Table of contents

NP (not numbered)
NP (not numbered)
NP (not numbered)
NP (not numbered)
NP (not numbered)
p.1
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p.3
p.4
p.5
p.6
p.7
p.8

Full record

Title : Les fleurs du mal / par Charles Baudelaire
Author : Baudelaire, Charles
Publisher : Poulet-Malassis et De Broise (Paris)
Date of publication : 1857
Type : monographie imprimée
Language : French
Format : 248 p. ; 19 cm
Format : application/pdf
Copyright : domaine public
Identifier : ark:/12148/bpt6k70861t
Source : Bibliothèque nationale de France, Rés. Ye-3535
Relation : <http://catalogue.bnf.fr/ark:/12148/cb37367035f/description>
Provenance : bnf.fr
Theme : French & related literatures

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Les Fleurs du Mal: Digitised

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Text mode | Audio mode

page NP (screen 1 of 258)

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Title : Les fleurs du mal / par Charles Baudelaire

Author : Baudelaire, Charles

Publisher : Poulet-Malassis et De Broise (Paris)

Date of publication : 1857

Type : monographie imprimée

Language : French

Format : 248 p. ; 19 cm

Format : application/pdf

Copyright : domaine public

Identifier : ark:/12148/bpt6k70861t

Source : Bibliothèque nationale de France, Rés. Ye-3535

Relation : <http://catalogue.bnf.fr/ark:/12148/cb37367035f/description>

Provenance : bnf.fr

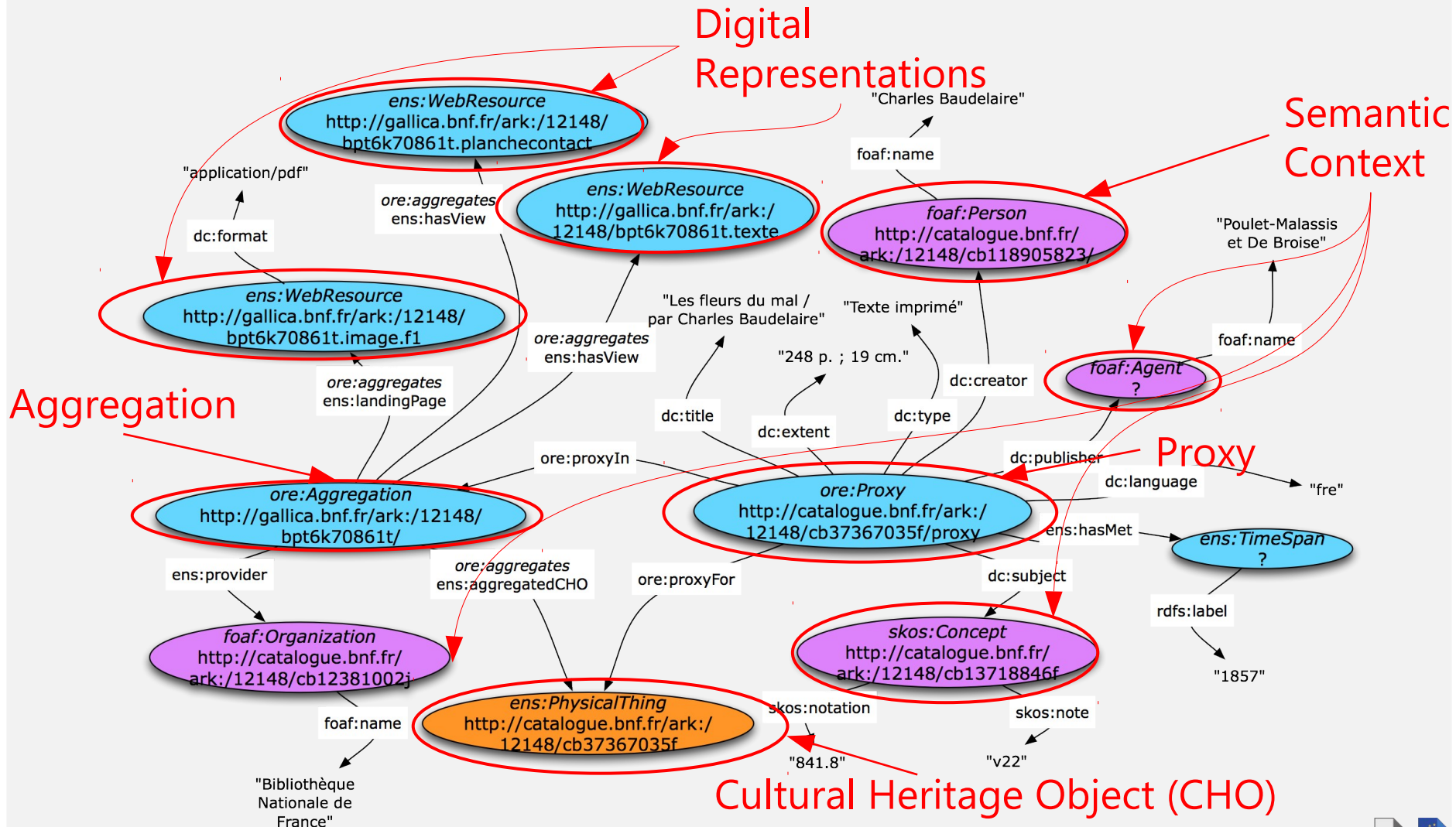
Theme : French & related literatures

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Les Fleurs du Mal: EDM



What can you use it for: De arte venandi cum avibus

De Arte Venandi ... (1)

Frederick II, Holy Roman Emperor: De arte venandi cum avibus. Moamin. Gerardus Falconarius. Ghatrif. Grisofus medicus



Shelfmark	Valencia Universitat de València, Biblioteca Històrica BH Ms. 601
Author	Frederick II, Holy Roman Emperor, 1194-1250 Gerardus, Falconarius Ghatrif Grisofus, Medicus
Date of Origin	around 1470
Place of Origin	Italy
Material	parchment
Extent	304 f.
Dimensions	329 x 211 mm
Illuminated	yes
Language	Latin

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De Arte Venandi ... (3)

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viaf.org/viaf/66596013/

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Virtual International Authority File


Suchen


Feld auswählen: Index auswählen: Suchbegriffe:


Gesamter VIAF

Suchen

Frederick II, Holy Roman Emperor, 1194-1250   















Frédéric II empereur germanique 1194-1250 

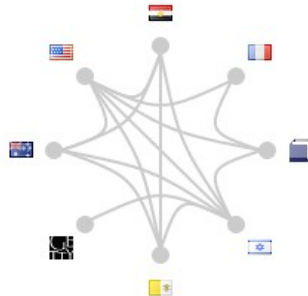
1250-1194 فردريك الثاني، الإمبراطور الروماني المقدس، 

Frederick II, Holy Roman Emperor Roman emperor, 1194-1250 

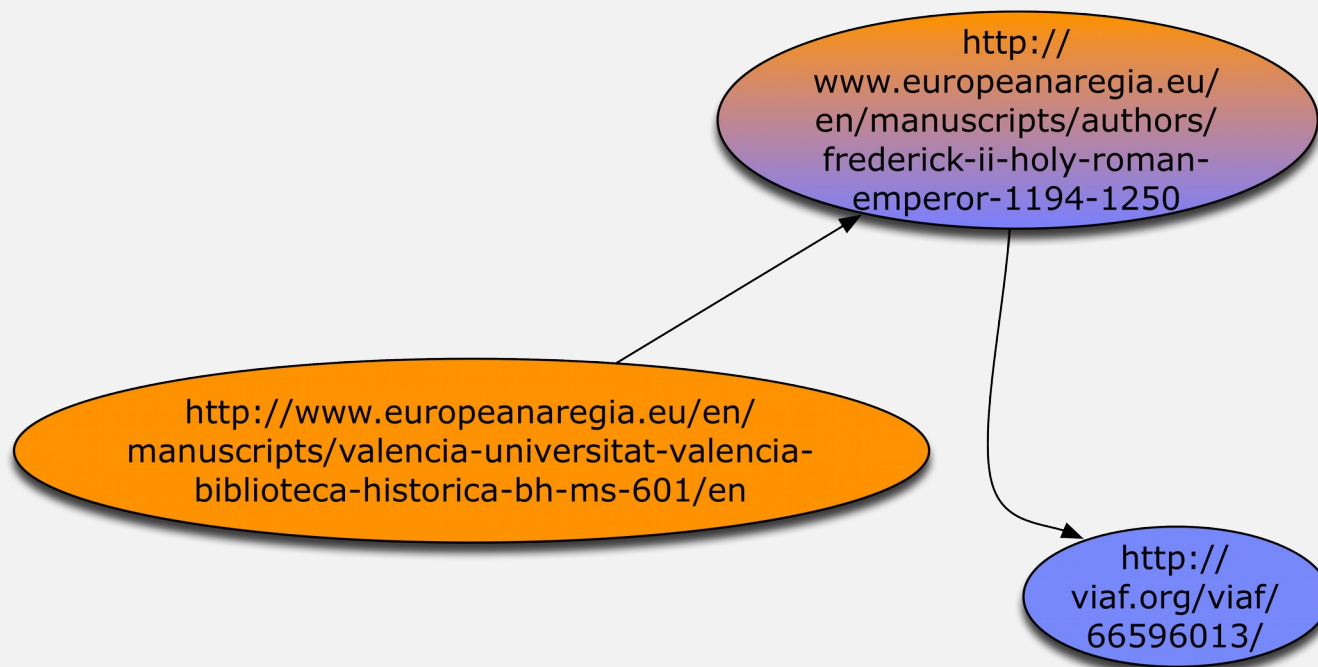
VIAF ID: 66596013 (Personal)
Permalink: <http://viaf.org/viaf/66596013>

Vorzugsbezeichnungen

-   100 0 _ [1a Frederick 1b II, 1c Holy Roman Emperor, 1d 1194-1250](#)
-   100 0 _ [1a Frédéric 1b II, 1c empereur germanique, 1d 1194-1250](#)
-   200 _ | [1a Frédéric 1d II 1c empereur germanique 1f 1194-1250](#)
-   100 0 _ [1a فردريك 1b الثاني, 1c الإمبراطور الروماني المقدس, 1d 1194-1250](#)
-   100 0 _ [1a Frederick 1b II, 1c Holy Roman Emperor, 1d 1194-1250](#)
-   100 0 _ [1a Frederick 1b II, 1c Holy Roman Emperor, 1d 1194-1250](#)
-   100 1 _ [1a Frederick II, Holy Roman Emperor 1g Roman emperor, 1194-1250](#)



De Arte Venandi ... Subgraph 1



De Arte Venandi ... (4)

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Bildschirmfoto Ablage Bearbeiten Foto Fenster Hilfe

Europeana Profes: x VIVO | connect - x Edoc - Dokument x COST/SISEL Trai x Europeana Regia x 25 Google Kalender x Protokoll Besprecl x crossref.org : : pu x

www.europeana-regia.eu/en/manuscripts/places/italy

Erste Schritte Apple Neuer Ordner DMZE Pundit Import to Mendeley Yahoo! Google Maps YouTube Wikipedia News Beliebt » Andere Lesezeichen

CA DE EN ES FR NL

HOME PROJECT EUROPEANA REGIA HISTORICAL COLLECTIONS MANUSCRIPTS NEWS LINKS

Italy

Getty Thesaurus of Geographic Names ID Number: 1000080
URL: http://www.getty.edu/vow/TGNFullDisplay?find=1000080&place=&nation=&prev_page=1&...

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De Arte Venandi ... (5)

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Bildschirmfoto Ablage Bearbeiten Foto Fenster Hilfe

Europeana Pro | VIVO | connect | edoc - Dokument | COST/SISMEL | Europeana Reg | TGN Full Record | 26 Google Kalend | Protokoll Bespr | crossref.org

www.getty.edu/vow/TGNFullDisplay?find=1000080&place=&nation=&prev_page=1&english=Y&subjectid=1000080

Erste Schritte Apple Neuer Ordner DMZE Pundit Import to Mendeley Yahoo! Google Maps YouTube Wikipedia News Beliebt » Andere Lesezeichen

Research


Research Home > Tools > Thesaurus of Geographic Names > Full Record Display

Getty Thesaurus of Geographic Names® Online

Full Record Display

[New Search](#) [Previous Page](#) [Help](#)

[Vernacular Display](#) | **English Display**

Click the  icon to view the hierarchy.

ID: 1000080 **Record Type: administrative**

Italy (nation)


Coordinates:
Lat: 42 50 00 N *degrees minutes* Lat: 42.8333 *decimal degrees*
Long: 012 50 00 E *degrees minutes* Long: 12.8333 *decimal degrees*

Note: Inhabited since 50,000 BCE; settled by Indo-Europeans 1850 BCE, Etruscans 1600 BCE, and Greeks 800 BCE; united by Romans 270 BCE; independent states rose after fall of Holy Roman Empire, notably Naples, Milan, Florence, Venice and papacy; reunited in the 19th century; official language is Italian, though significant minorities speak German, French, and Slovene.

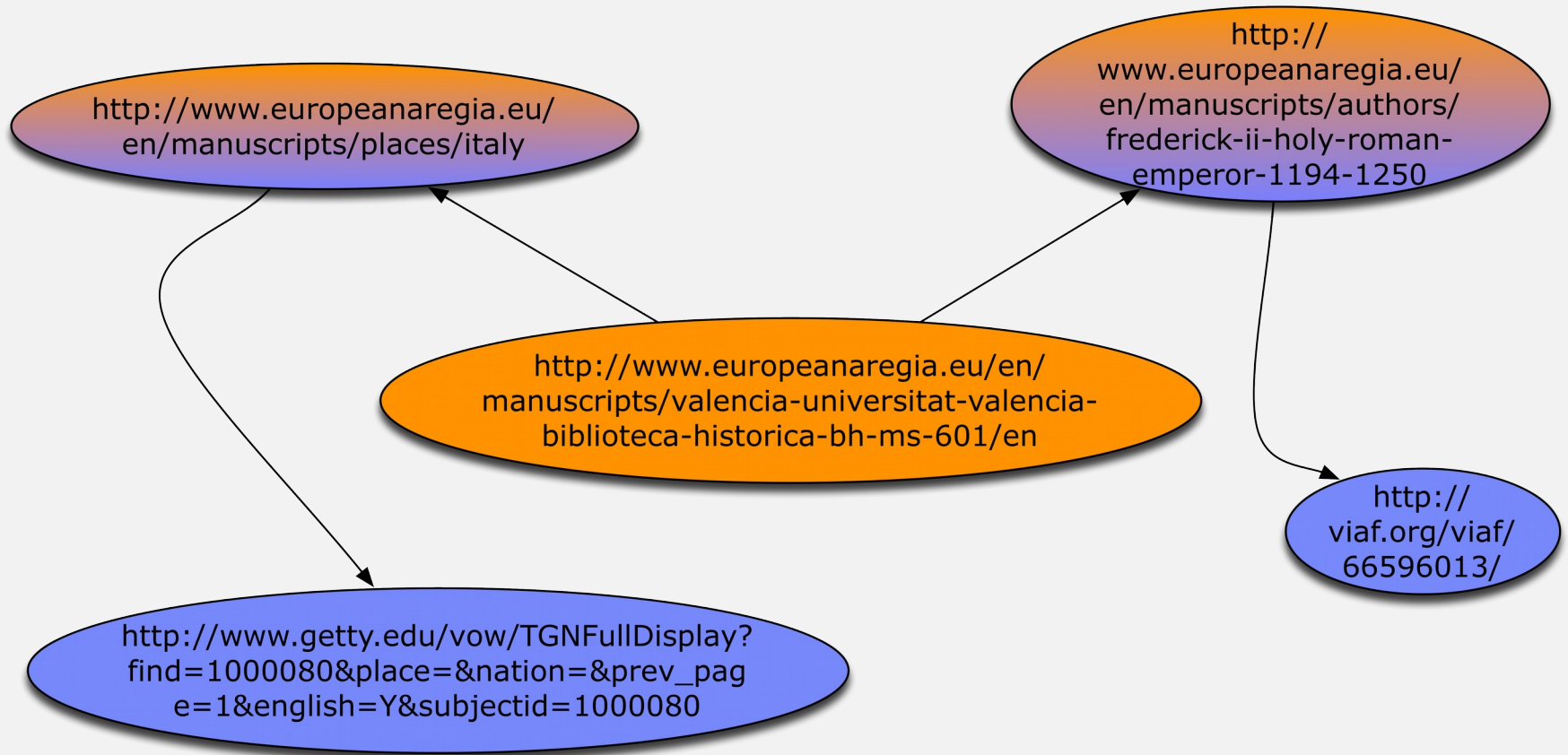
Names:

Italia (**preferred**, C, V, Spanish-P, U, N) Roman name; is also modern Italian name
(Italian-P, U, N)
(Latin-P, U, N)

Repubblica italiana (C, V, O, Italian, U, N)
Repubblica Italiana (C, V, Italian, U, N)
Italy (C, O, English-P, U, N)



De Arte Venandi ... Subgraphs 1+2



Frederick II, Holy Roman Emperor: De arte venandi cum avibus. Moamin. Gerardus Falconarius. Ghatrif. Grisofus medicus



Shelfmark	Valencia Universitat de València, Biblioteca Històrica BH Ms. 601
Author	Frederick II, Holy Roman Emperor, 1194-1250 Gerardus, Falconarius Ghatrif Grisofus, Medicus
Date of Origin	around 1470
Place of Origin	Italy
Material	parchment
Extent	304 f.
Dimensions	329 x 211 mm
Illuminated	yes
Language	Latin

De Arte Venandi ... (6)

Bildschirmfoto Ablage Bearbeiten Foto Fenster Hilfe

Europeana Prof VIVO | connect edoc - Dokume COST/SISMEL T Europeana Reg Latin; latin - LC Google Kalend Protokoll Bespr crossref.org

id.loc.gov/vocabulary/iso639-2/lat.html

Erste Schritte Apple Neuer Ordner DM2E Pundit Import to Mendeley Yahoo! Google Maps YouTube Wikipedia News Beliebt Andere Lesezeichen

LIBRARY OF CONGRESS

ASK A LIBRARIAN DIGITAL COLLECTIONS LIBRARY CATALOGS

Search Search Loc.gov GO

The Library of Congress > Linked Data Service > ISO639-2 Languages

Latin; latin

From [ISO 639-2: Codes for the Representation of Names of Languages - Part 2: Alpha-3 Code for the Names of Languages](#)

Details Visualization

Latin

latin

Bibliographic Code

URI(s)

> <http://id.loc.gov/vocabulary/iso639-2/lat>

Instance Of

> [MADS/RDF Language](#)

> [MADS/RDF Authority](#)

> [SKOS Concept](#)

> [RDF Resource](#)

> [ISO6392 Language](#)

Scheme Membership(s)

> [ISO 639-2: Codes for the Representation of Names of Languages - Part 2: Alpha-3 Code for the Names of Languages](#)

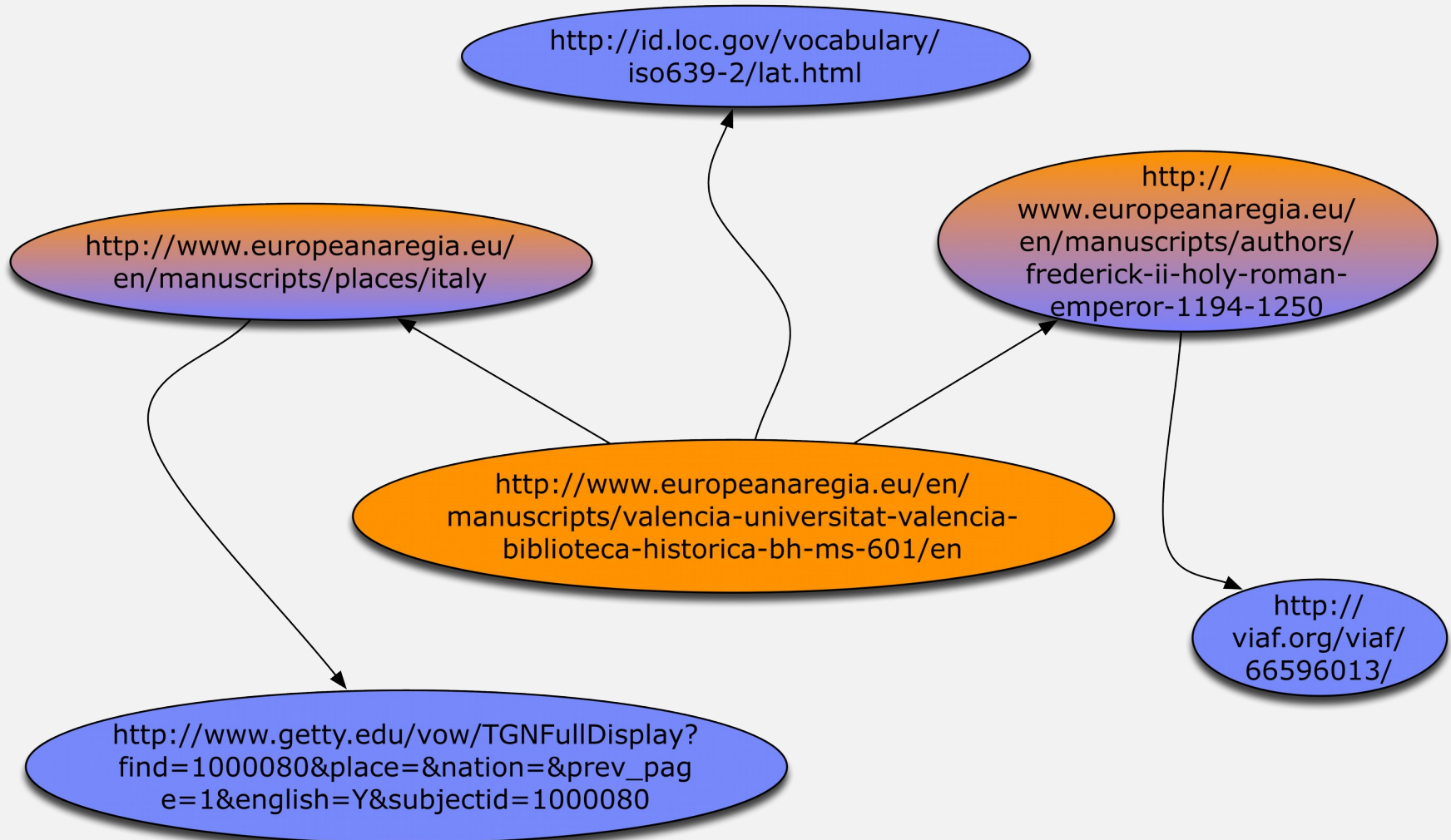
Collection Membership(s)

> http://id.loc.gov/vocabulary/iso639-2/collection_iso639-2_Bibliographic_Codes

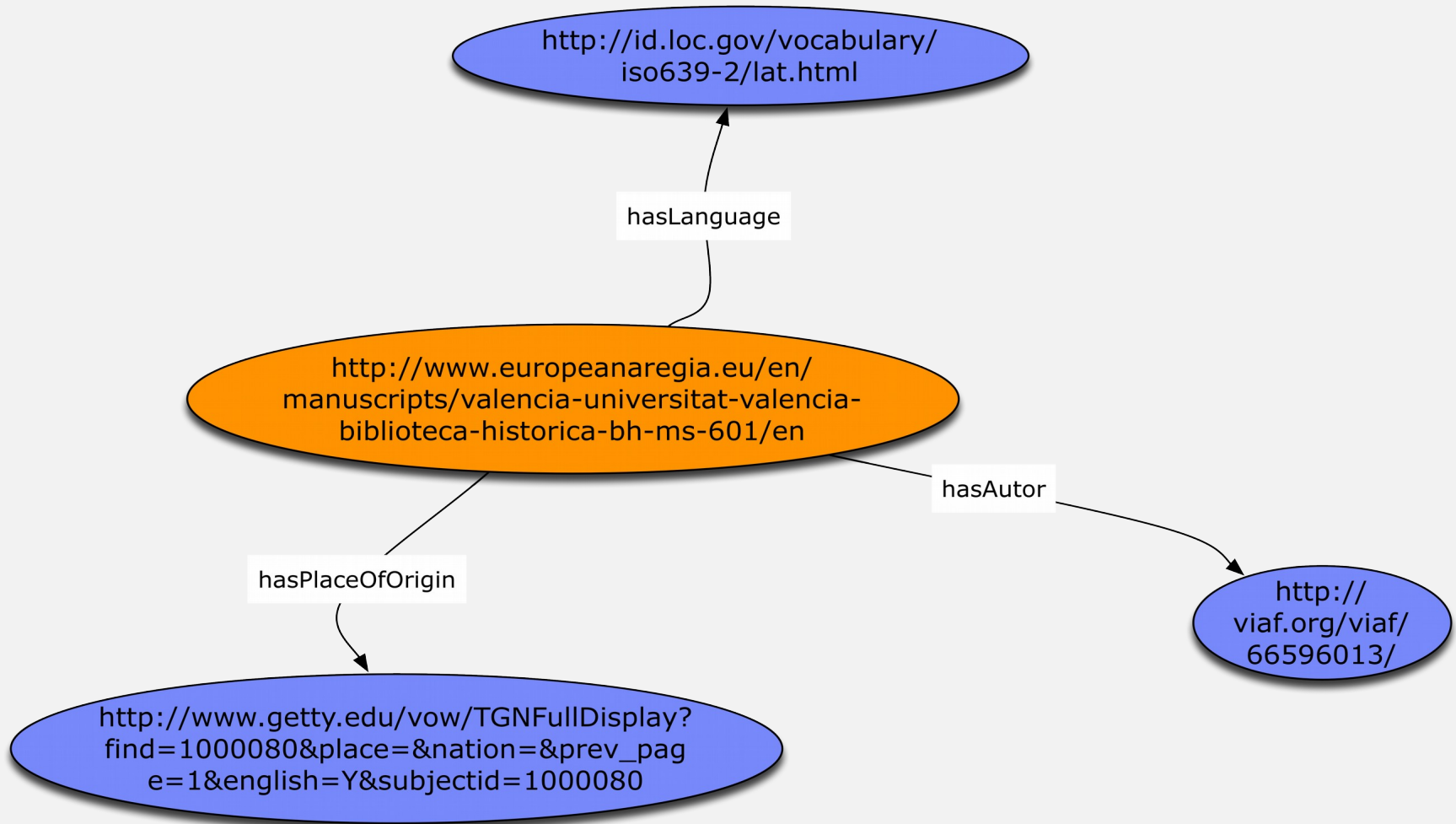
> http://id.loc.gov/vocabulary/iso639-2/collection_PastPresentISO639-2Entries

> http://id.loc.gov/vocabulary/iso639-2/collection_iso639-2

De Arte Venandi ... (6)



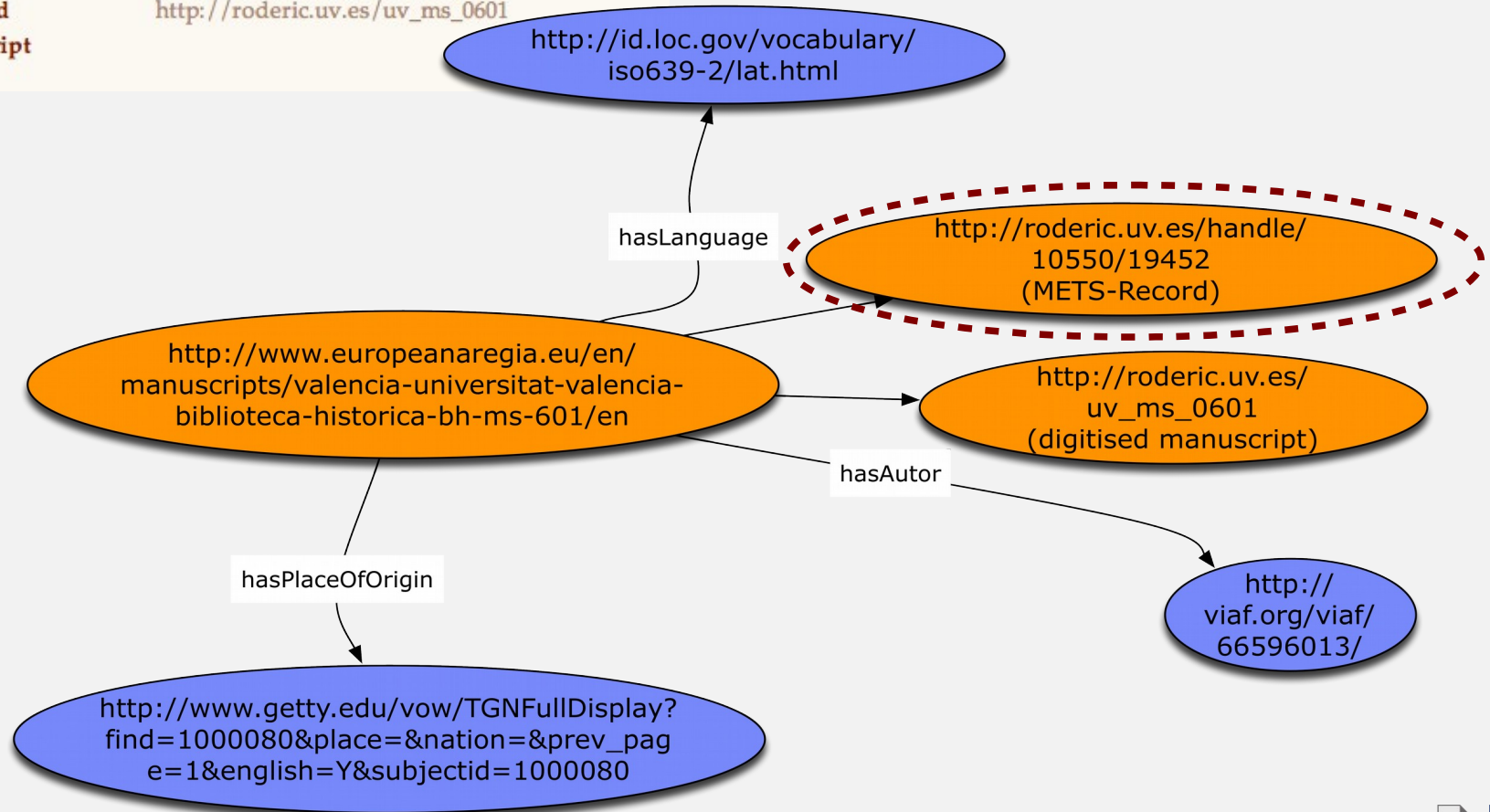
De Arte Venandi ... done 'right'



De Arte Venandi ... there's more!

Full Manuscript Record
http://trobes.uv.es/record=b1948745
http://roderic.uv.es/handle/10550/19452

Digitised Manuscript
http://roderic.uv.es/uv_ms_0601



De Arte Venandi ...

there

<http://id.loc.gov/vocabulary/iso639-2/lat.html>

xmlui.dri2xhtml.METS-1.0.item-somn[Prologus] "[text] Presens opus agendi nos induxit instans tua petitio
vir clarissime, M. S. ... nobiles delectantur, vita comite, post
complementu[m] huius operis diceatur a nobis. [rúbr.] Divi augusti
Federici secundi romanor hasLanguage usalem fetl Scicilie fscil
regis super librum De avibus [et] aquarum prolaq dcterms:hasPart
2. f. 5r-56r: "[rúbr.] Incipit[ue] eius tractat[us] [et] primo de divisione
g[e]n[er]aliter aviu[m] in aquaticis terrestribus [et] mediis. Item in
rapacibus [et] non rapacibus. [text] In hoc autem primo tractatu huius
operis dicemus generaliter de avibus ...; [f. 55r] [et] que dicuntur
anates campestres [et] plures alie ... [f. 56r] [rúbr.] Expicitus est
primus tractatus"

ore:Aggregation
De Arte Venandi ...

3. f. 56r-115r: "[rúbr.] Incipit[ur] de eius
particulis. ... [et] de posterior
venatio... Ex ... posterior
est q[uam] paulatina ...
4. f. 115r-145r: "[rúbr.] Incipit[ur] [ter]cius. Dictum est
mansuefactione falconu[m] cum capello. Seq[ui]tur de
instrumentis p[er] quos redeat ad homines. [text] Intentio n[on]
principio diximus est docere venationes ... [et] ledere etiam ipsos in
p[er]sona. [rúbr.] Explicet liber quartus [tat]at[ur] [ter]cius"
5. f. 145r ore:aggregates ber quartus. De girofalcone ad gruem,
que est quare in venatione quare eo. [text]
ad grues ... qua[m] habent modi falcomu hasPlaceOfOrigin [rúbr.]
Explicet liber quartus de girofalcis ad grues"
6. f. 174v-205v: "[rúbr.] Incipit liber quintus. De falcone sacro ad
ayrones. [text] Determinatum est in precedentib[us] sufficienter
girofalcis ... Et grus volans percutit falconem ayro aute
Dictum est de ... falcone ad grues. Explicet

http://roderic.uv.es/uv_ms_0601
(digitised manuscript)

http://roderic.uv.es/handle/uv_ms_0601/1-f-3r-5r.html
(METS-Record)

edm:isNextInSequence

http://roderic.uv.es/handle/uv_ms_0601/2-f-5r-56r.html
(METS-Record)

edm:isNextInSequence

http://roderic.uv.es/handle/uv_ms_0601/3-f-56r-115r.html
(METS-Record)

<http://viaf.org/viaf/66596013/>

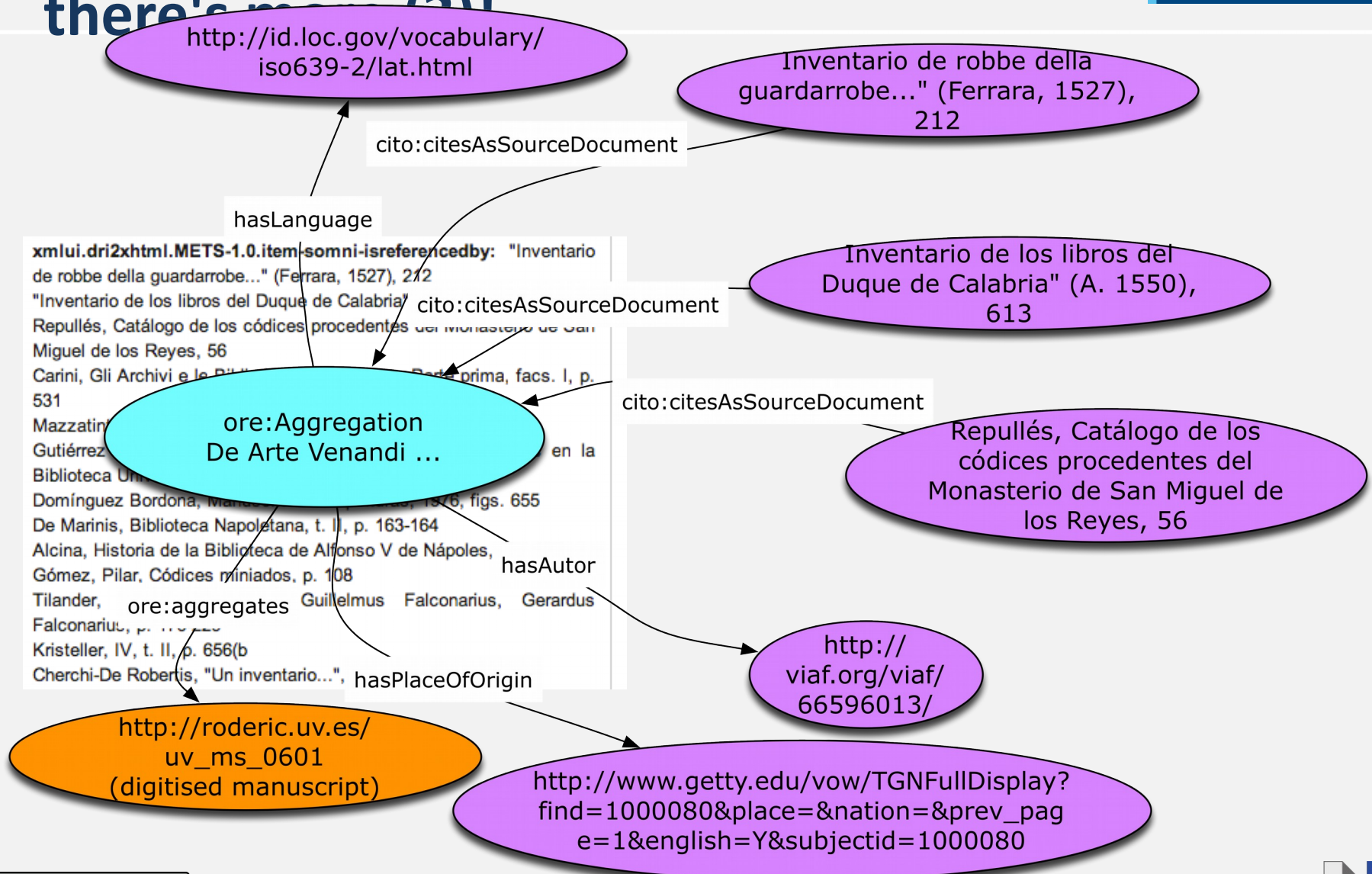
http://www.getty.edu/vow/TGNFullDisplay?find=1000080&place=&nation=&prev_page=1&english=Y&subjectid=1000080

Metadata: from Records to Graphs

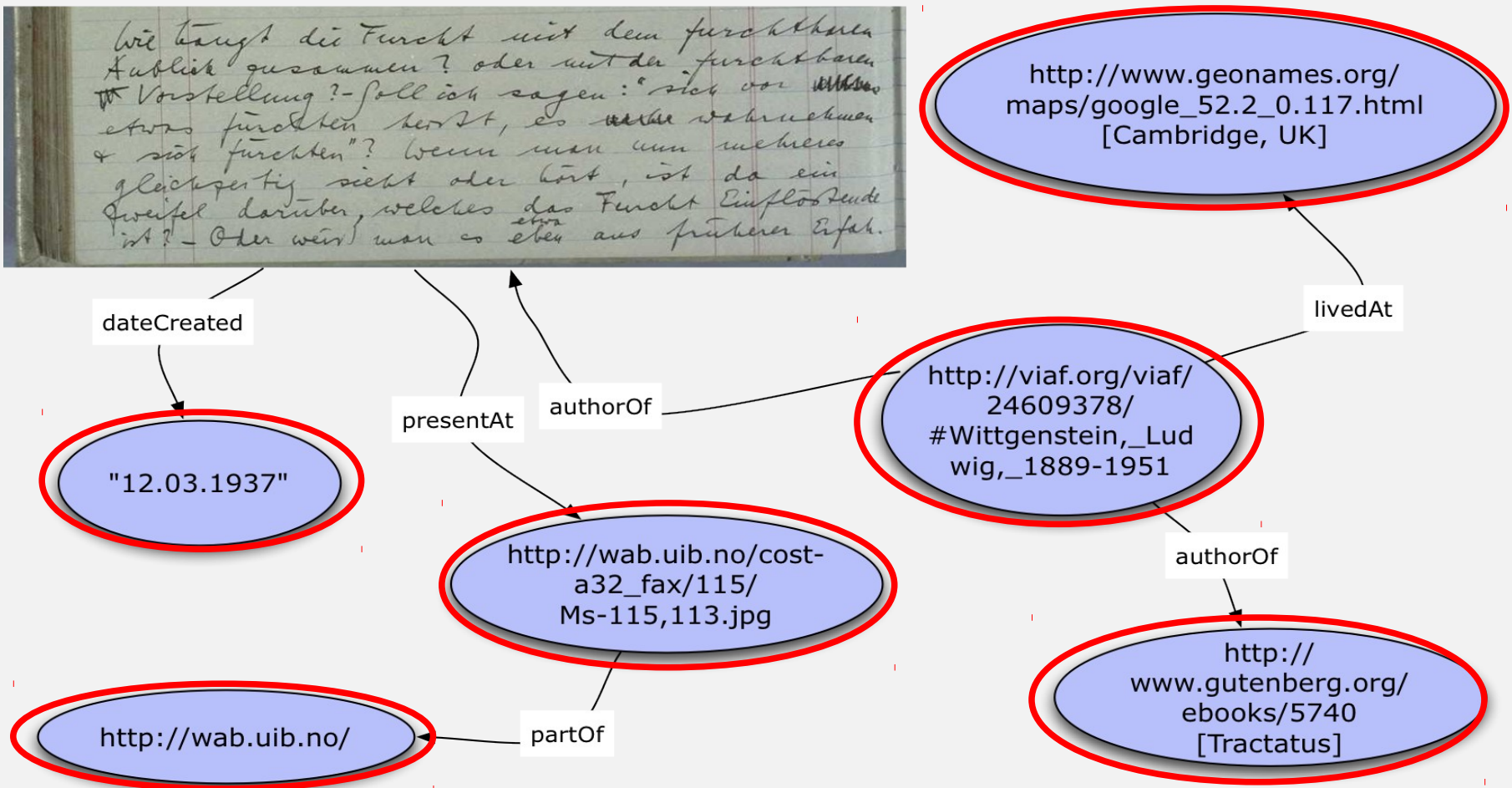
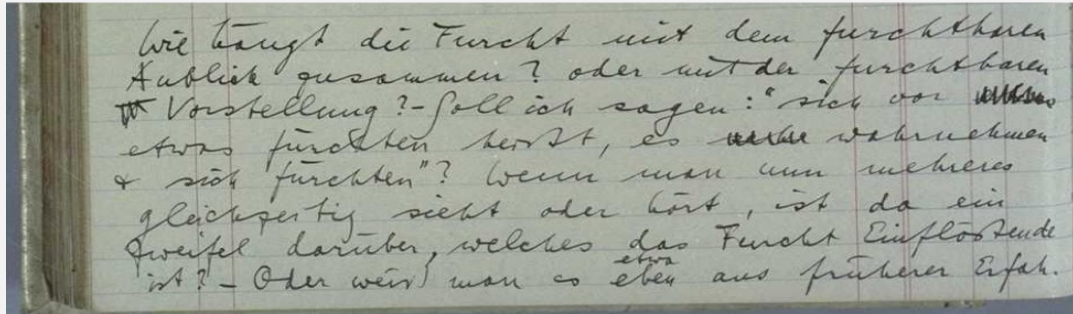
Stefan Gradmann, OAI8, Genève, 19/06/2013

De Arte Venandi ...

there's more (2)



Contextualising Wittgenstein



An Opportunity for the Library ...

... and what it needs to do to be up to it

“What do you do with a million books?” (Greg Crane)

- Digitisation and semantic publishing result in
 - growing quantity
 - increased complexity
- Well beyond scholarly processing capacity (=reading faculty)
- Scientists and Scholars will badly need help in three areas:
 - **Semantic abstracting, named entity recognition** for “strategic reading” (Renear)
 - **Contextualisation** of information objects
 - Robust **reasoning and inferencing** yielding digital heuristics
- => **Opportunities for Research Libraries!**

Ceci n'est pas une bibliothèque

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Ceci n'est pas une bibliothèque



Catalogue



The card catalog in the nave of Sterling Memorial Library at Yale University. Picture by Henry Trotter, 2005.

Catalogue Entry: MARC Record

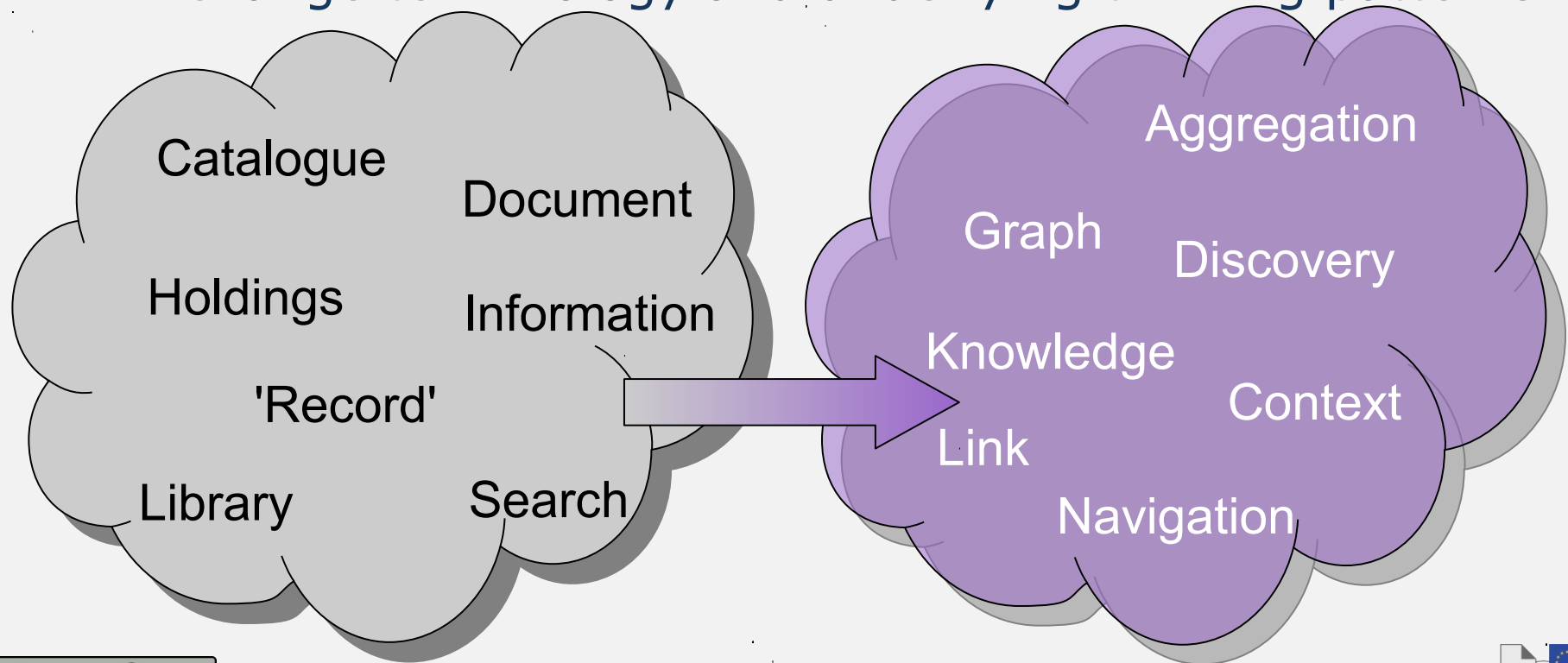
LEADER: 00495cam 2200169 a 4500
001 94205672
003 DLC
005 2004010812243.0
008 940907s1926 gw 000 1 ger
010 \$a 94205672
040 \$aDLC\$cDLC\$dDLC
050 00 \$aPT2621.A26\$bS36 1926
100 1 \$aKafka, Franz,\$d1883-1924
245 14 \$aDas Schloss :\$bRoman /\$cFranz Kafka.
260 \$aMünchen :\$bKurt wolff Verlag,\$c1926.
300 \$a505 p. ;\$c20 cm.
561 \$aSource: Bequest of Aaron Copland, Fall, 1989.\$5DLC

'Library Collections'



Change Thinking, Change Terminology!

- Libraries will serve research as part of the Linked Open Data web – or else risk becoming insignificant.
- For operating this change we definitely need to change terminology and underlying thinking patterns:



Sticking to empty metaphors ...

"What's in a name? That which we call a rose
By any other name would smell as sweet."

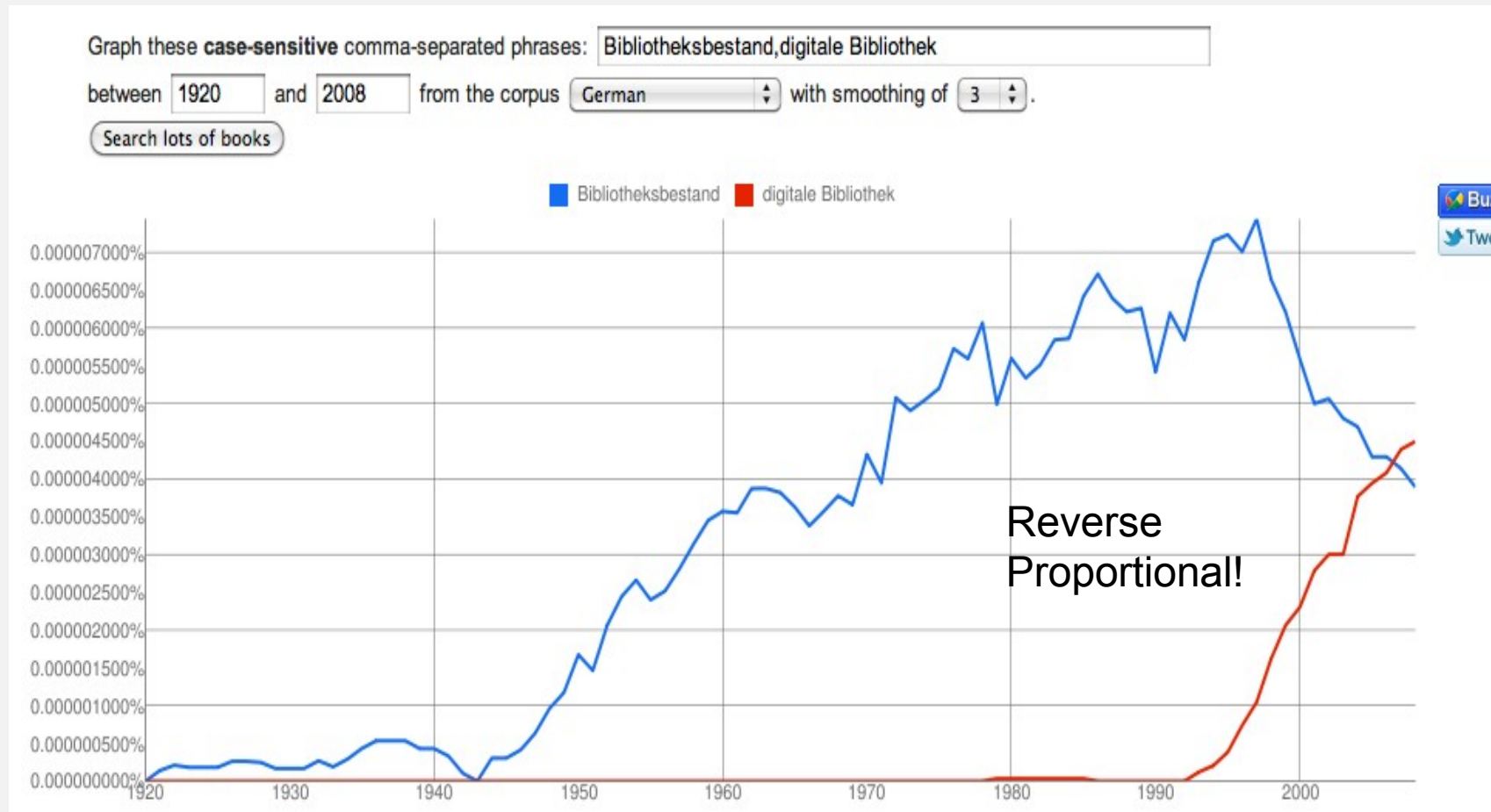
(Shakespeare, Romeo and Juliet (II, ii, 1-2))

Why then do we stick to emptied metaphors?

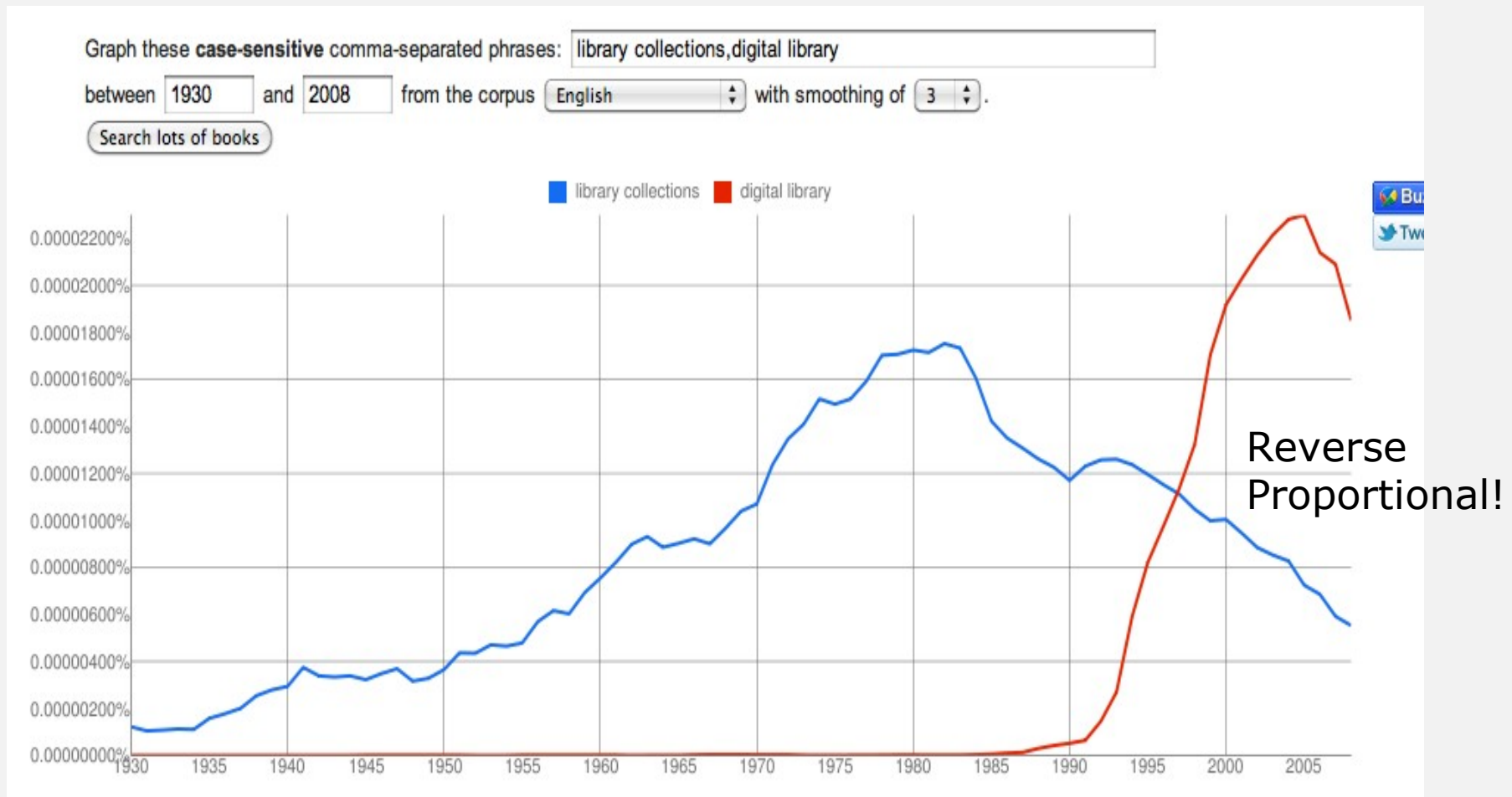
- ... because they **constitute identity** (a very bad reason!)
- ... because they guarantee **institutional persistency** (a fallacy!)
- ... because we are afraid of substantial changes and believe in **things changing only once we use new terms** (dangerously childish!)
- ... or simply because **we do not have new terms** yet?

Let us then start looking for them!

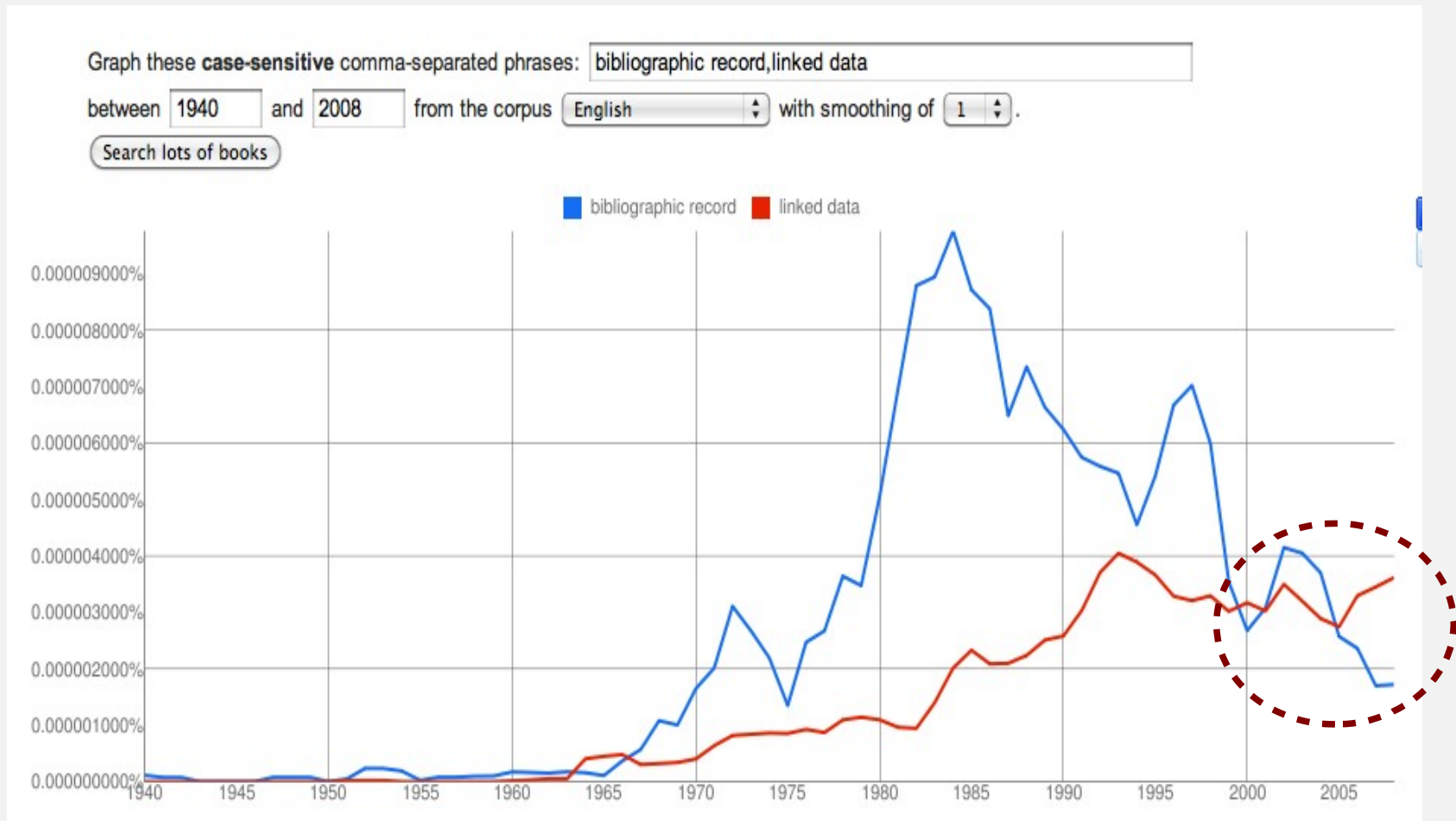
From 'Catalogues' to 'Graphs': old terms – new terms (1)



From 'Catalogues' to 'Graphs': old terms – new terms (2)



From 'Catalogues' to 'Graphs': old terms – new terms (3)



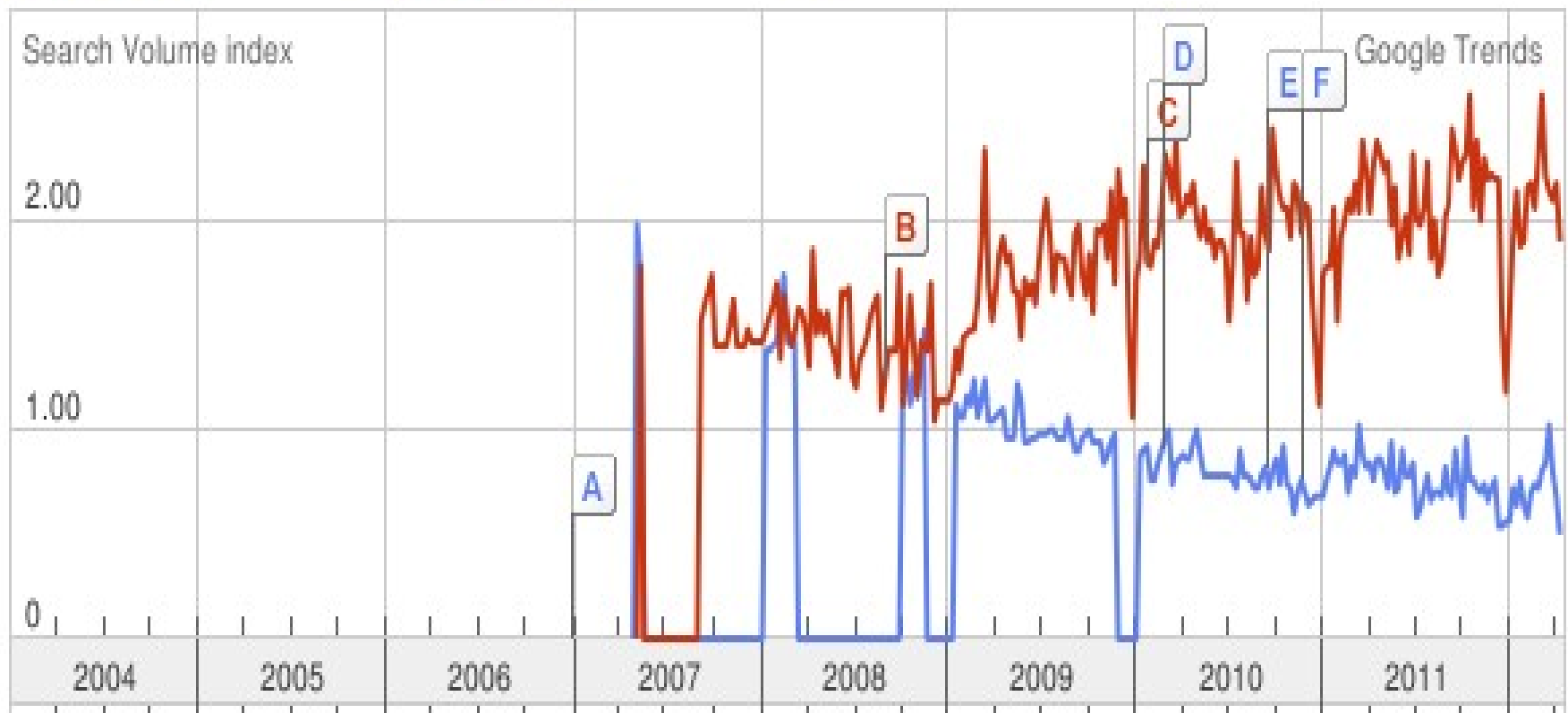
From 'Catalogues' to 'Graphs': old terms – new terms (4)

cataloguing

0.38

linked data

1.00



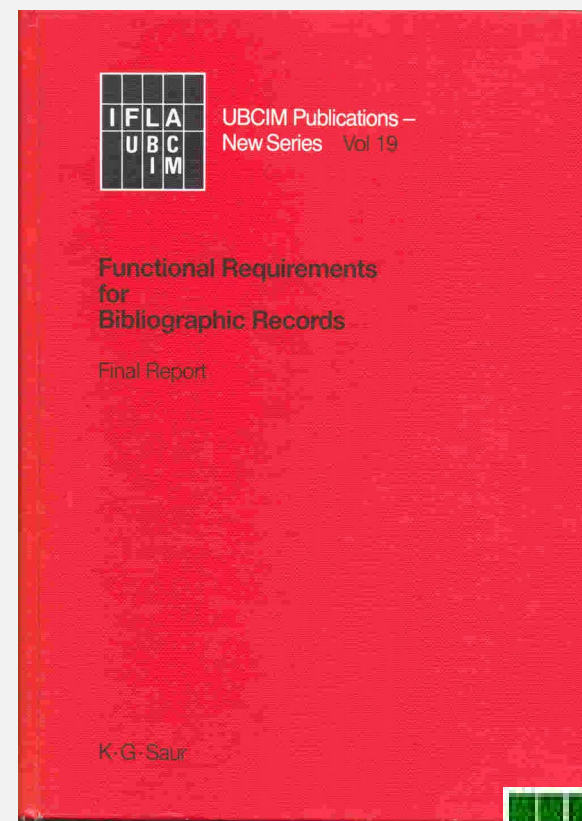
There is a Life after MARC and AACR2 ...

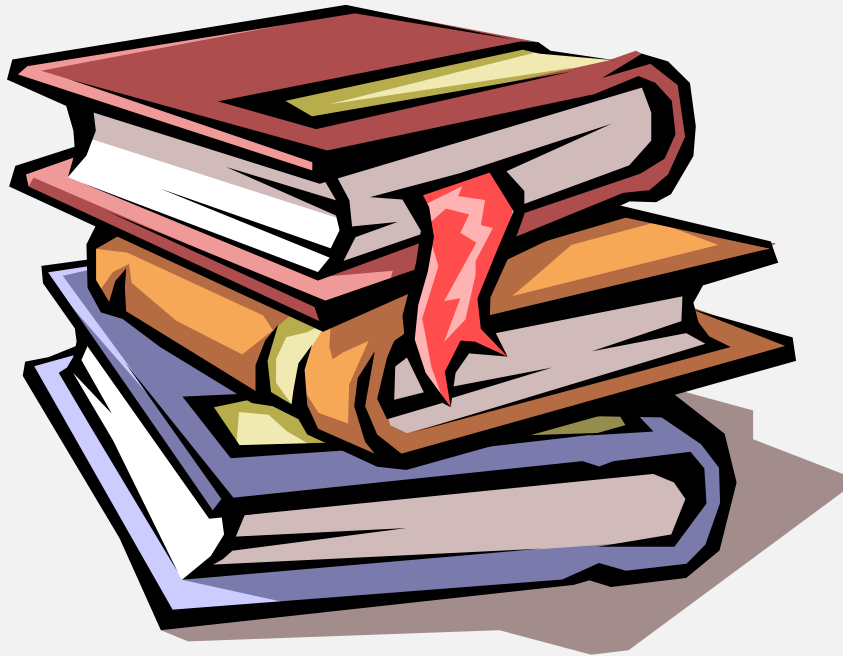
... reconceptualising the bibliographic universe

FRBR

What is FRBR

- A conceptual model for bibliographic descriptions
- An Entity-Relationship-Model
 - Entities: Groups 1, 2 und 3
 - Relations
 - Attributes (metadata)
- Functional Scope
 - find, identify, select, preserve
- FRBR ≠
 - Data model, data format, rule set, metadata schema, application





- “Book”
 - Physical Object
(item)
 - 'Publication' in Bookstores (ISBN, any given item)
(manifestation)



- “Book”
 - Translator?
(expression)
 - Author? (work)

Group 1 – Relations between Entities

Intellectual /
Artistic Content

Work

Expression

Is realized through

Manifestation

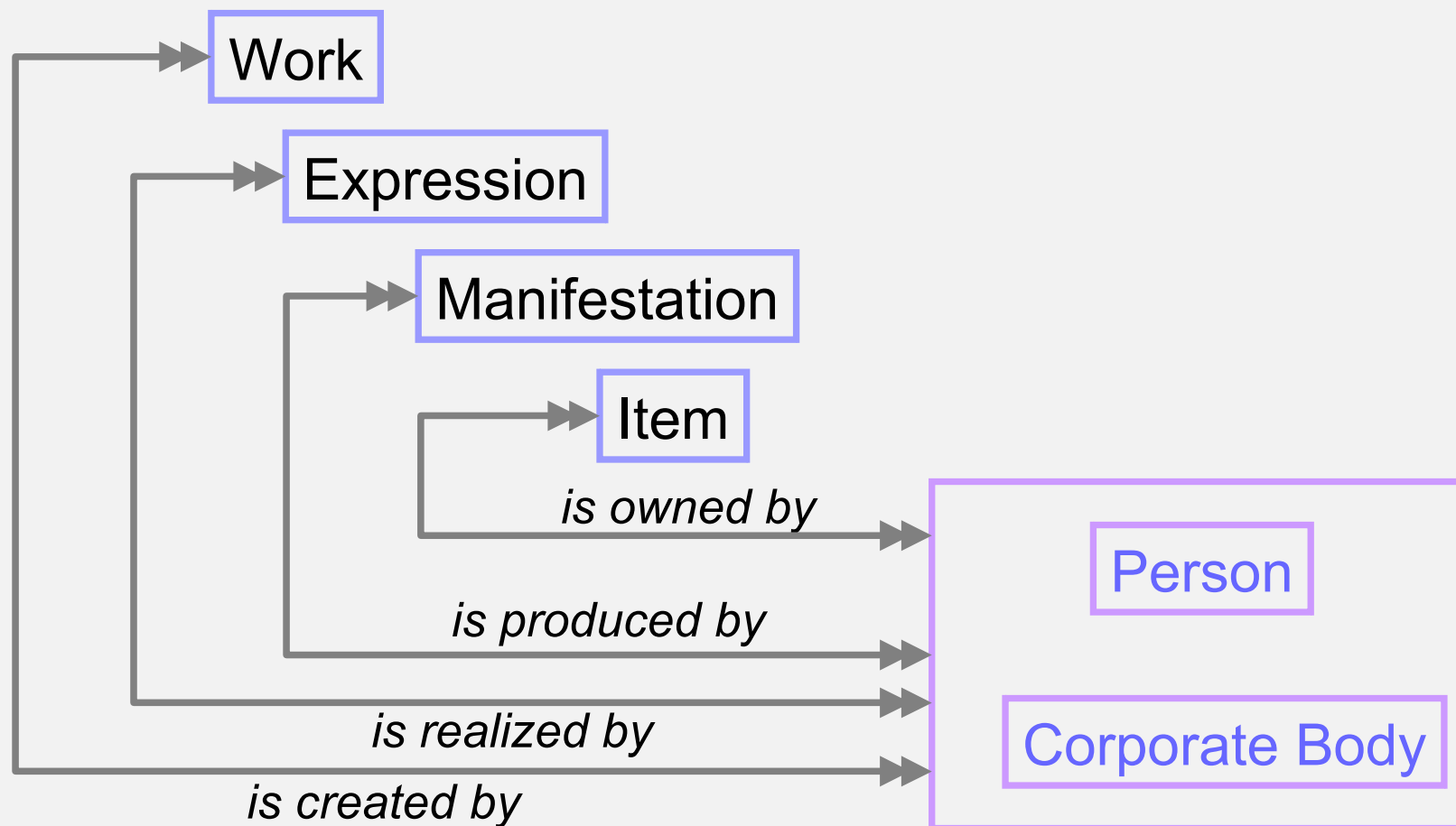
Is embodied in

Physical
Recording
Of Contents

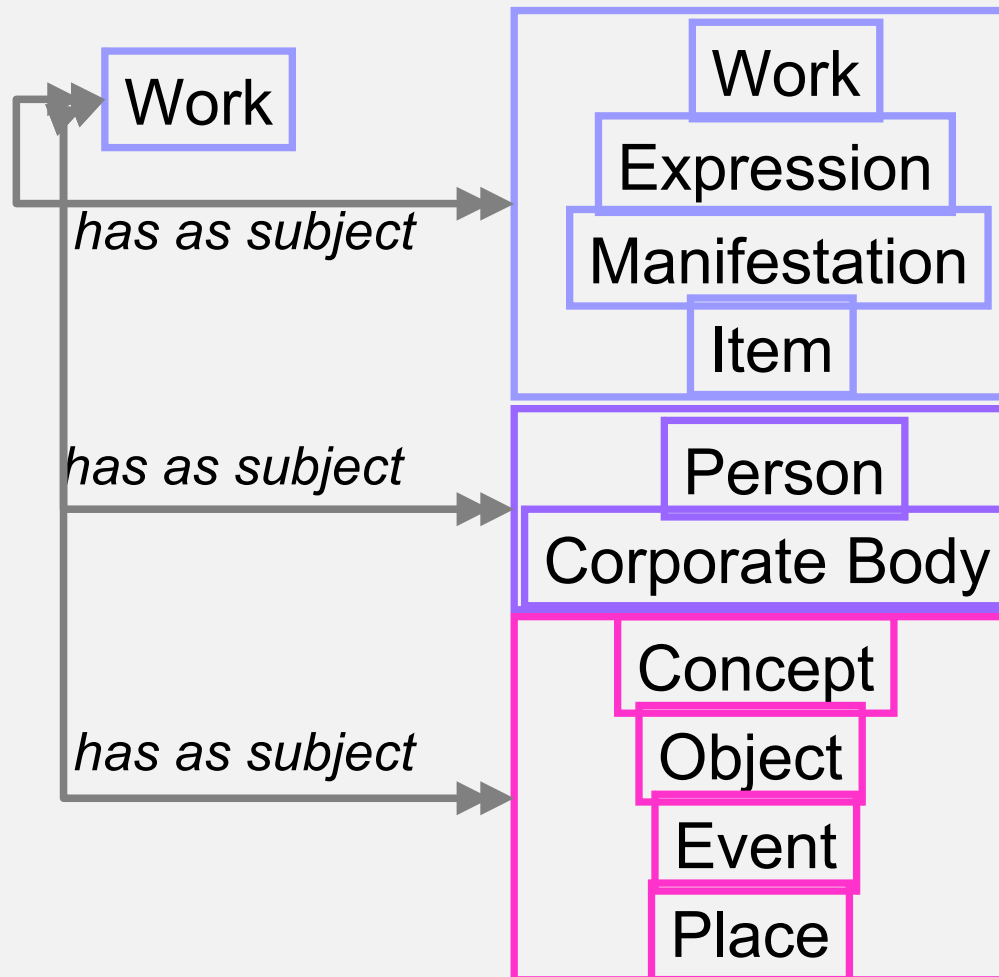
Item

Is exemplified by

Group 2: Relations to persons and corporate bodies



Group 3: thematic relations of group 1 entities



EQUIVALENT		DERIVATIVE				DESCRIPTIVE	
Microform reproduction		Editions			Free translation	Review	
Copy	Simultaneous "publication"		Abridged edition		Summary Abstract Digest	Casebook	
		Revision	Illustrated edition		Dramatization Novelization Screenplay Libretto	Criticism	
Exact reproduction	Translation		Expurgated edition		Change of genre	Evaluation	
Facsimile			Arrangement		Parody Imitations	Annotated edition	
Reprint	Variations or versions		Slight modifications		Same style or thematic content	Commentary	
					Adaptations		
Original	Same work			New work			

New Expression

Cataloging Rules

cut-off point

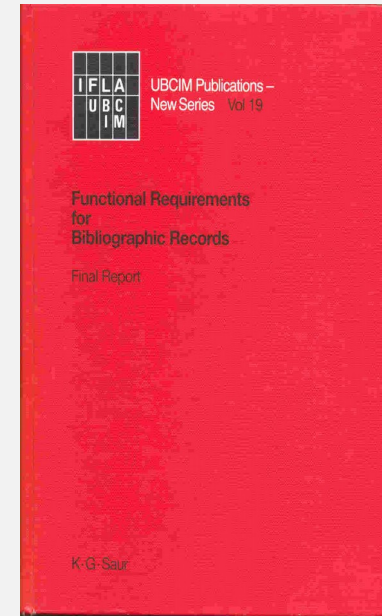
New Work

B. Tillett
Dec. 2001

- **Work**
 - ID
 - Title
 - Date
 - etc.
- **Expression**
 - ID
 - Title
 - Form
 - Date
 - Language
 - etc.
- **Manifestation**
 - ID
 - Title
 - Statement of responsibility
 - Edition
 - Statement of Responsibility
 - Carrier properties
 - Access conditions
 - Access modes
 - etc.
- **Item**
 - ID
 - Provenience
 - Location
 - etc.

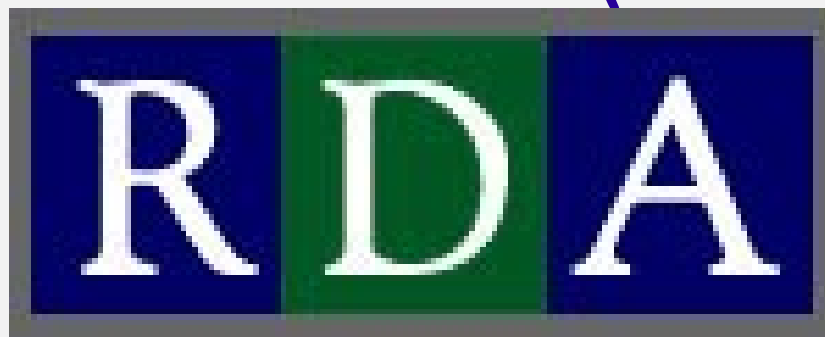
Application of the FRBR Concept Model

- FRBR is a conceptual model
 - No specific implementation is prescribed
- Implementation examples:
 - OpenVlacc
www.bibliotheek.be
 - OCLC FictionFinder
<http://fictionfinder.oclc.org>
 - VTLS Virtua
<http://bib.uclouvain.be/lib/item?id=chamo:1397047&theme=UCL>



- Better structuring of catalog presentations
- Simplified cataloguing
- Reduced cataloguing load
 - Every work is represented only once for all of its Expressions
 - Every expression is represented only once for all of its manifestations
 - Likewise for manifestations: items just stay what they are.
- Clean layering enables opening of librarian applications to the WWW
- But: ***What is a work???***

Resource Description and Access (RDA)



What is RDA?

- Cataloguing rules succeeding AACR2 (originally named AACR3)
 - Established by the AACR Joint Steering Committee
- Clearly going beyond cataloguing rules
- Implements FRBR
- Should be in use from 2013 onwards

Why not just another Revision of AACR2?



- AACR2
 - 1978
 - 1988
 - 1998
 - 2002

The Context of 'Cataloguing' has changed profoundly

- Increased range of information carriers ...
- ... and increased depth and complexity of content structures
- Generating metadata isn't a librarian professional privilege anymore
- Increased multitude of metadata formats (DC!)
- Rapidly increasing impact of standards established by W3C

Changing Terminology

AACR2	RDA
Heading	Access Point
Authority Control	Access Point Control
Authorized Heading	Preferred Access Point
Main Entry	Primary Access Point
Added Entry	Secondary Access Point
Uniform Title	Preferred Title

- Content vs. Presentation of Container Attributes
 - RDA is basically about content, not container
 - RDA-Records can still be displayed in an ISBD compliant way if required.
- Transcription
 - “Take what you see”
 - Error correction
 - Supports automated indexing
- Provides an open door towards the 'Semantic' Linked Open Data Web!
- Is saturated with backward oriented compromises

- Fusion of “MARC must die” and Linked Data @ LOC.gov
- cf. <http://bibframe.org/>
- Bibliographic Framework as a Linked Data Model
- Main Classes
 - Creative Work - a resource reflecting a conceptual essence of the cataloging item.
 - Instance - a resource reflecting an individual, material embodiment of the Work.
 - Authority - a resource reflecting key authority concepts that have defined relationships reflected in the Work and Instance. Examples of Authority Resources include People, Places, Topics, Organizations, etc.
 - Annotation - a resource that decorates other BIBFRAME resources with additional information. Examples of such annotations include Library Holdings information, cover art and reviews.

- W3C, Schema.org
- cf. <http://www.w3.org/community/schemabibex/>
- Based on schema.org:CreativeWork
 - “the most generic kind of creative work, including books, movies, photographs, software programs, etc.”
(<http://schema.org/CreativeWork>)

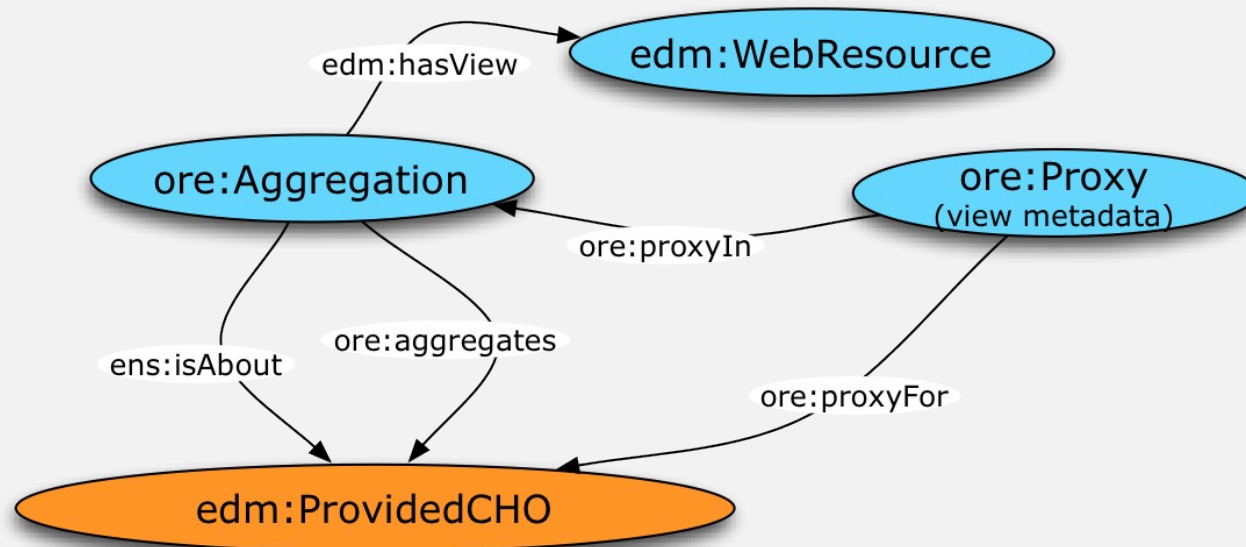
Ontologically Conceptualizing Bibliographic Entities

- PRISM
 - XML/RDF based industry standard, more at <http://www.idealliance.org/specifications/prism-metadata-initiative>
- BIBO
 - Extends PRISM, more at <http://bibliontology.com/>
- SPAR / FaBIO
 - RDF based representation of FRBR, more at <http://sempublishing.sourceforge.net/> and <http://www.essepuntato.it/lode/http://purl.org/spar/fabio>

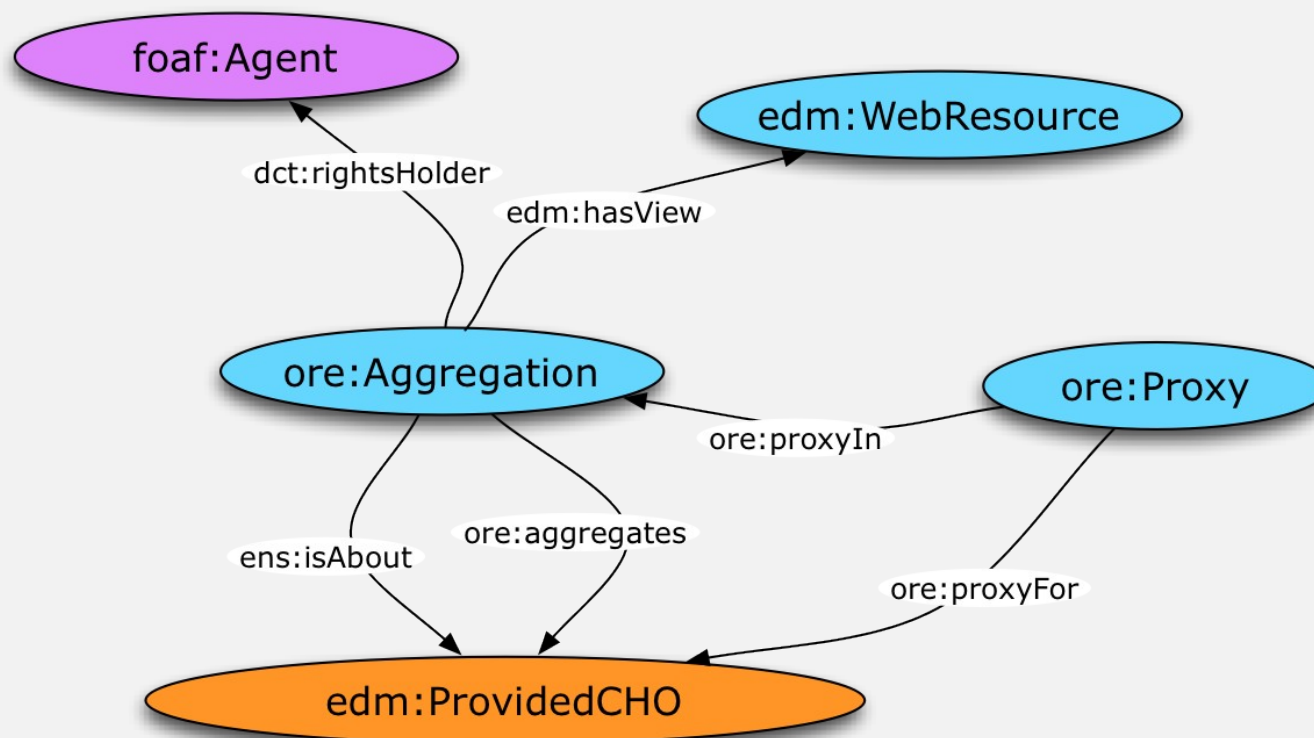


- We have learned some of these lessons in Europeana
 - we dropped the brand “EDL” very early
 - we decided not to have a 'catalogue'
 - We recently consolidated EDM and FRBRoo
- We know that the current portal is not enough
 - we devised the RDF based Europeana Data Model (EDM)
 - we are gradually migrating to EDM based operations
 - we make Europeana part of the Linked Open Data cloud

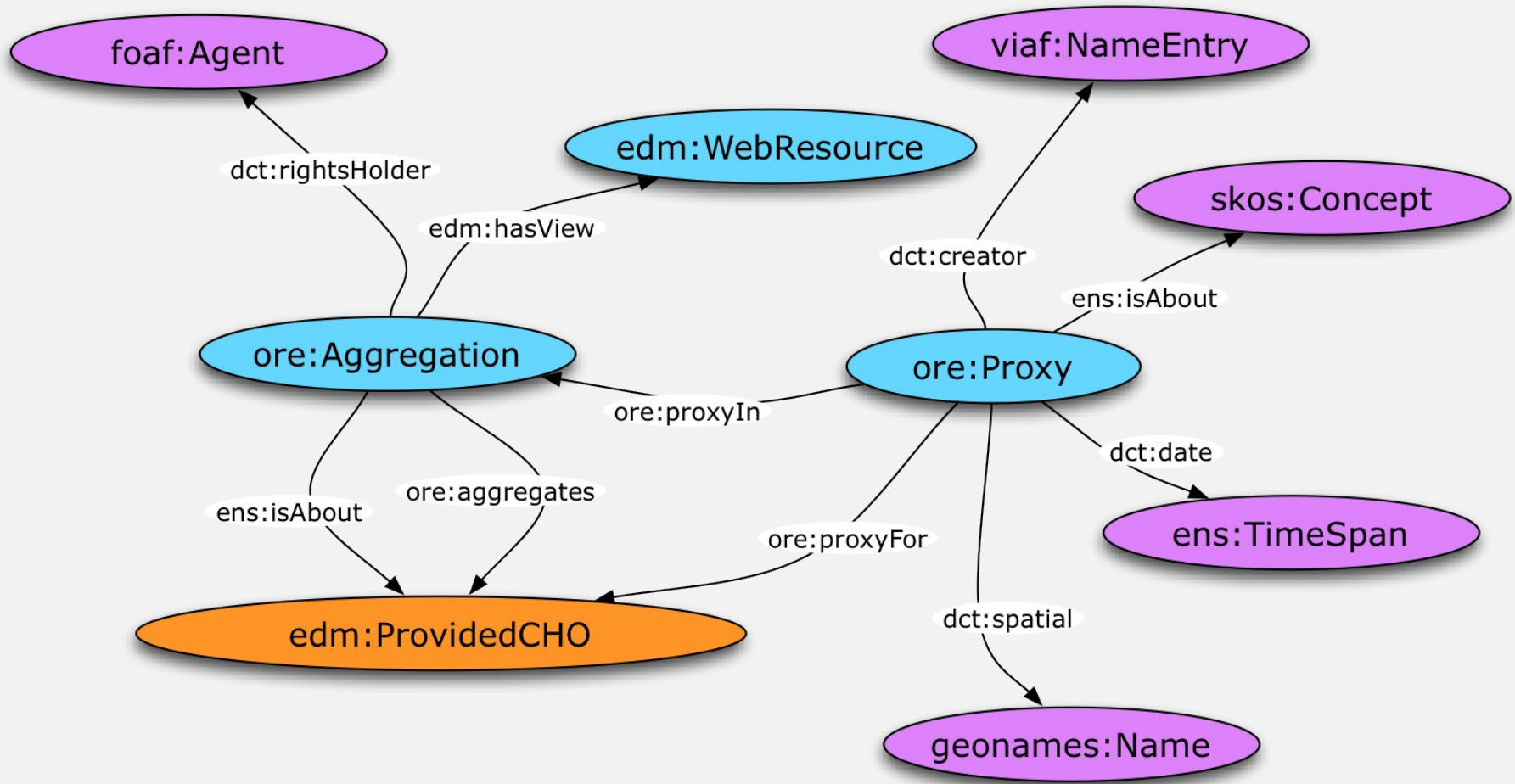
An Aggregation ...



... some context

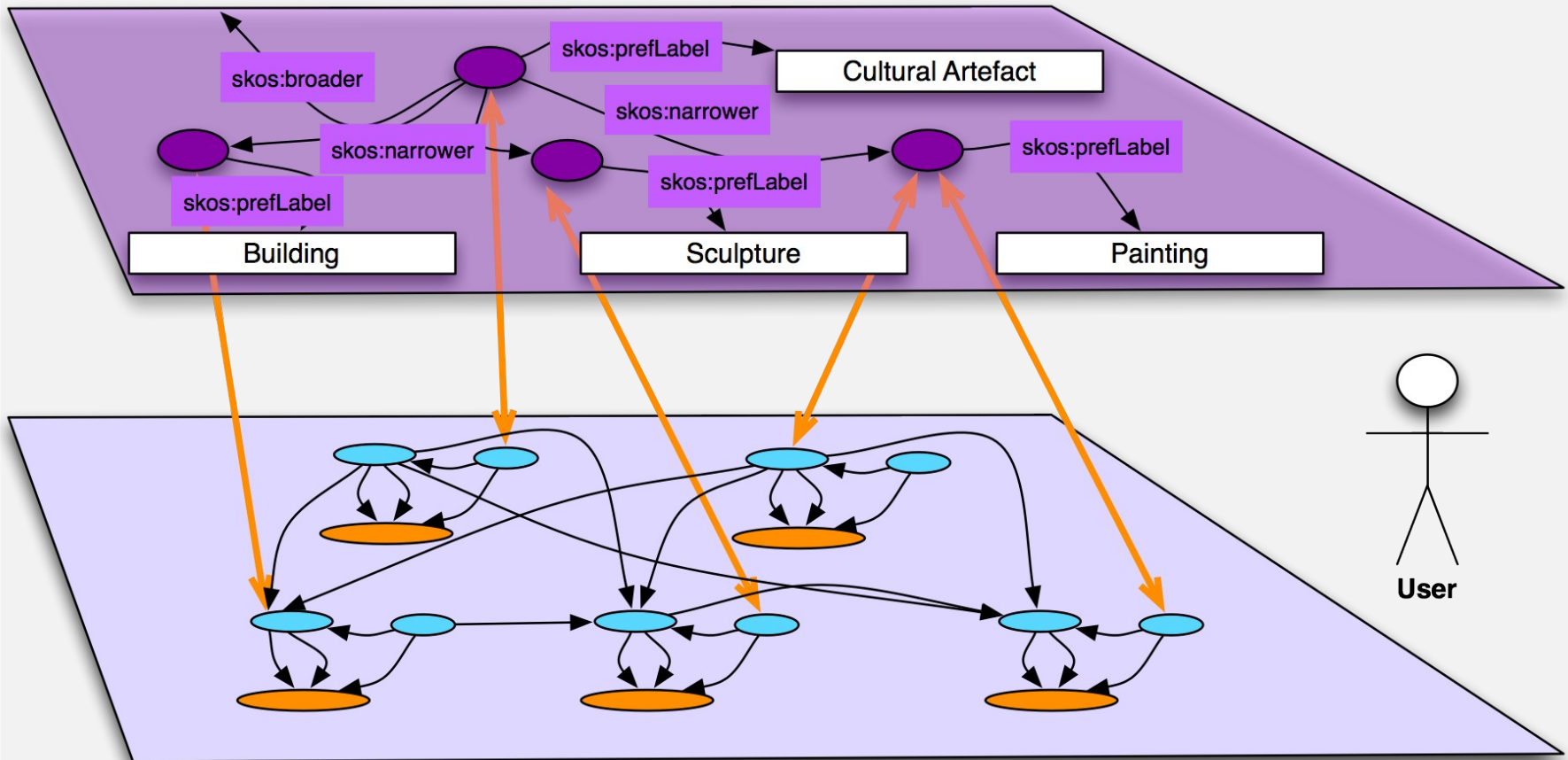


... more context



... and the Big Picture: Object and Semantic Data Layer

Semantic Network

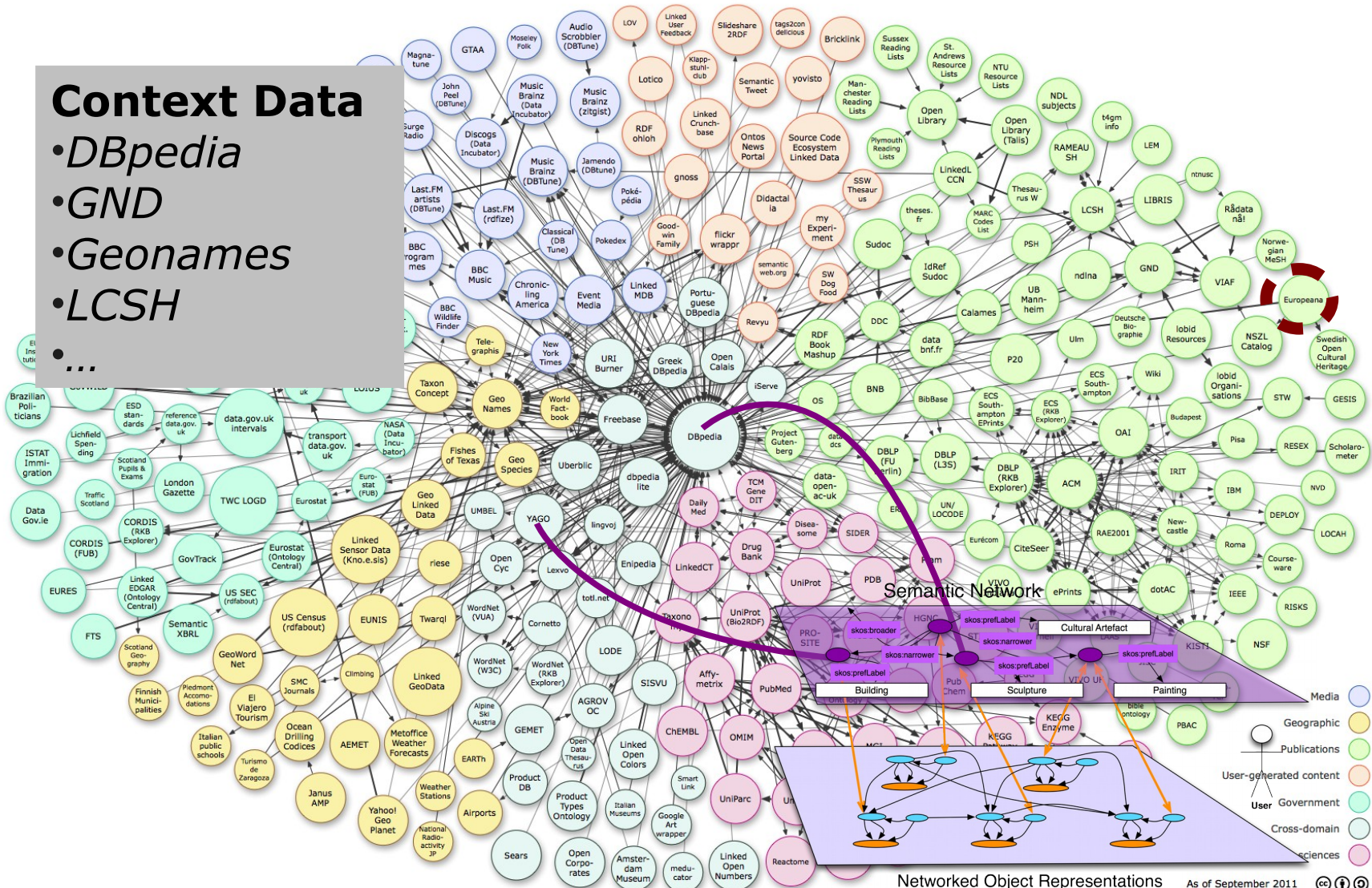


Networked Object Representations

EDM and Linked Open Data

Context Data

- DBpedia
- GND
- Geonames
- LCSH
- ...



Semantic Network

Networked Object Representations

As of September 2011

CC BY

Metadata: from Records to Graphs

Stefan Gradmann, OAI8, Genève, 19/06/2013

- **Europeana** wins ...
 - ... as a prime resource for digital humanities scholars
 - ... with a new and clearly focused customer group
- **Digital humanists** win
 - ... with a prime source of corpora on the WWW
 - ... with new research methods based on semantic technologies
- **Librarians** win ...
 - ... a new profile, a new identity
 - ... back in content and knowledge generation
 - ... on a par with scholars again
 - ***All libraries? All librarians??***

- Formats
 - πίνακες
 - Catalog cards
 - MARC Records
 - FRBR
 - RDF-Graphs
- Semantics
 - Cataloguing Rules (AACR)
 - RDA
 - Ontologies & Rulesets

Semantic Annotation: Pundit

Stefan.gradmann@kuleuven.be

<http://www.thepund.it/visualization-demos/timeline-demo/>

Suggested Reading

Gregory Crane (2006): What Do you Do with a Million Books? In: Dlib Magazine, Vol. 12, March. (<http://bit.ly/JhzF90>)

Gutenberg Paranthesis Research Group / University of Southern Denmark: Position Paper (<http://bit.ly/JjGKb6>)

David Parry: Burn the Boats/Books. Presentation to Digital Writing and Research Lab, Austin. (<http://bit.ly/JYLIJIV>)

David Shotton (2009a): Semantic Publishing. The coming revolution in scientific journal publishing. Learned Publishing Volume 22, No 2, 85–94, April 2009; doi:10.1087/2009202

David Shotton et al. (2009b): Adventures in Semantic Publishing: Exemplar Semantic Enhancements of a Research Article (<http://bit.ly/IgT5Km>)

Barend Mons, Jan Velterop: Nano-Publication in the e-science era (<http://bit.ly/IISMGt>)

Alan Renear, Carol Palmer (2009): Strategic Reading, Ontologies and the Future of scientific Publishing. In: Science, August 2009, p. 828 – 832.

Thank you for your patience and attention

